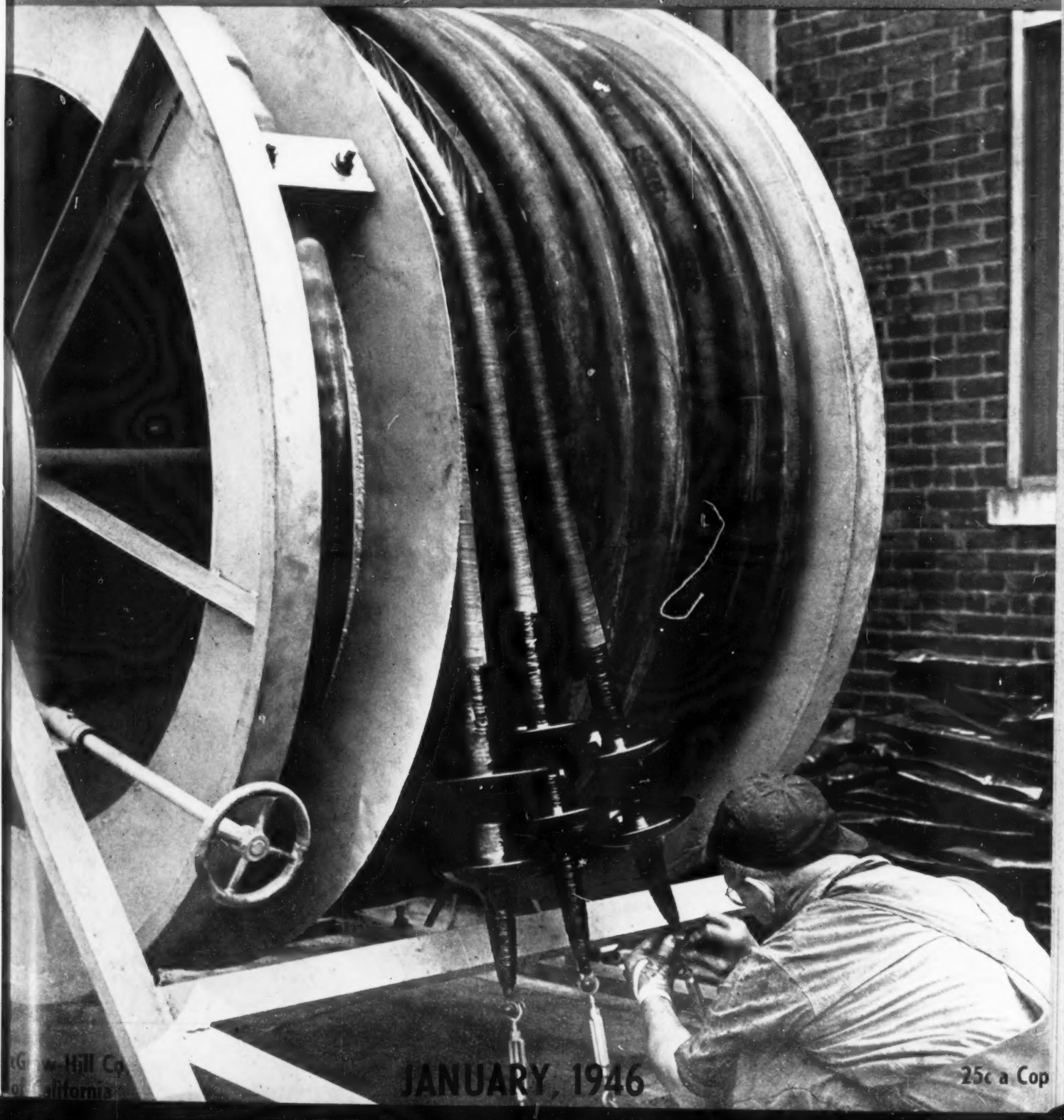
ELECTRICAL WEST

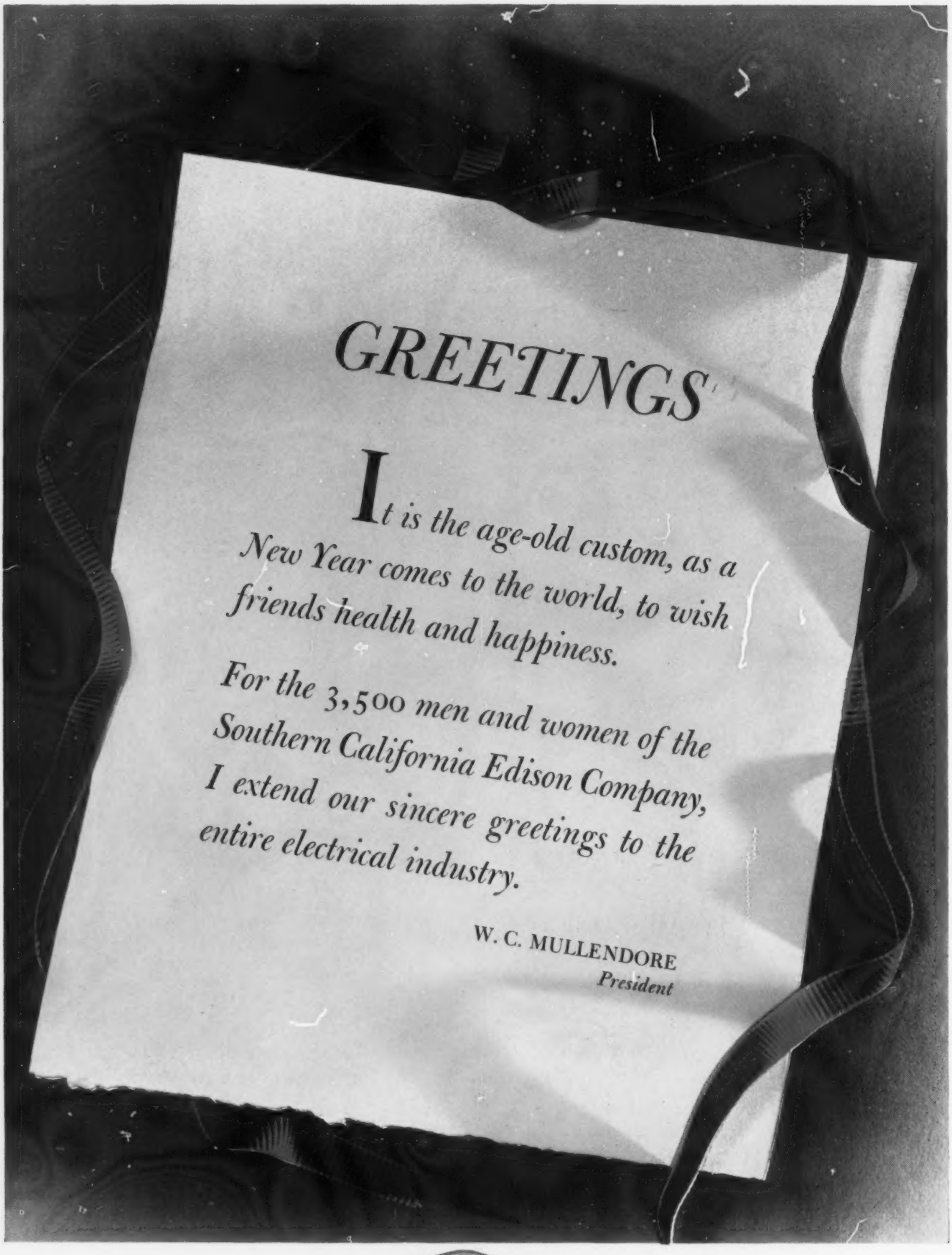
SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



G w-Hill Co
o California

JANUARY, 1946

25c a Cop


GREETINGS
It is the age-old custom, as a New Year comes to the world, to wish friends health and happiness.
For the 3,500 men and women of the Southern California Edison Company, I extend our sincere greetings to the entire electrical industry.
W. C. MULLENDORE
President

Publisher's Elec.

Copy 47

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), January, 1946. Vol. 96, No. 1. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, 4, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rates—U.S., U.S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $4, 2 years; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years. Single copy, 25c. Copyright, 1946. McGraw-Hill Company of California. All rights reserved.

G-E GAS-FILLED CABLE MET THIS CHALLENGING NEED FOR NEW ENGLAND UTILITY

Additional load demand in one section of the city created a problem for the Hartford Electric Light Company. The need was for a new cable to carry at least 15,000 kva. The only available duct along part of the route, however, was one having an inside clear diameter of 3 inches in some sections.

Various sizes and types of cable were considered, but most were ruled out by the mechanical limitations of the duct even when it was rodded to 3¼ inches. The 27-kv, 500,000-cir mil solid-type paper-insulated cable which would have done the job had an outside diameter of 3.05 inches. This did not allow sufficient clearance for pulling.

The choice was G-E gas-filled cable—27-kv, 500,000-cir mil, having a maximum diameter of 2.8 inches. More than 18,000 feet was soon installed, and service has been uninterrupted ever since.

In addition to solving the immediate problem posed by size, other benefits were obtained:

1. GAS-FILLED CABLE IS SELF SUPERVISING. When a leak occurs, an alarm is actuated by a simple pressure relay. Valving additional nitrogen into the cable protects it, and keeps the cable in service until it is convenient to make repairs.

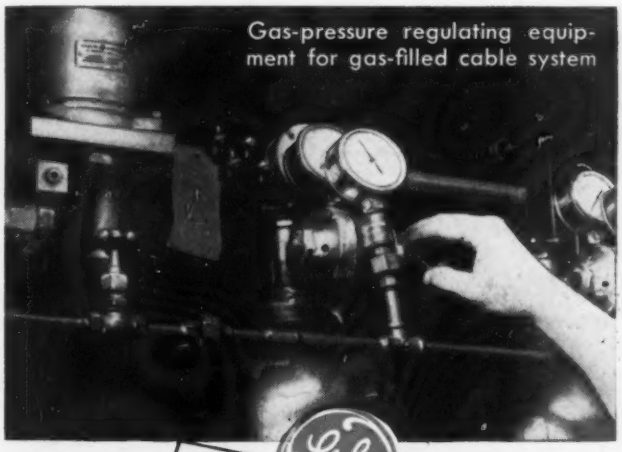
2. FAILURES AND SERVICE INTERRUPTIONS ARE MINIMIZED. Pressure is maintained at low, uniform level (10 to 15 lb per sq in.) inside the cable. There are no destructive pressure rises during load cycles and temperature changes.

3. NO PROFILE PROBLEMS. Unlike solid-type cable, there is no migration of compound on either steep grades or vertical risers.

4. AMPLE OVERLOAD MARGIN. A 15 per-cent overload in gas-filled cable imposes no excessive internal stresses on the lead sheath.

5. LOW INSTALLATION AND MAINTENANCE COSTS. Gas-filled cable costs little if any more to install than solid type. Ease of locating breaks through direction of gas-flow keeps maintenance cost low.

For more information on General Electric gas-filled cable, write for Bulletin GEA-3652. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*


Gas-pressure regulating equipment for gas-filled cable system

GENERAL ELECTRIC

GAS-FILLED CABLE

661-28-1200

ELECTRICAL WEST

VOL. 96 JANUARY, 1946 NO. 1

Horizon Is Bright for More Farm Electrification ..... H. B. Walker 53

Rural Power Line Telephone Service ..... Stanley Rapp 56

Electric House Heating Seminar 58

High-Frequency Heating Conference 59

Induction and Dielectric Heating Data 61

How Pressure Groups Influence the Code ..... James Moore Evans 64

They Learned the Latest "Low Down" 70

PCEA Awakens Dormant Opportunities 82

Exchange Views Regarding Personnel 88

Dave E. Harris Given the McGraw Award 92

Departments

Books 8
New Products 14
Sales Guide News Letter 23
Bulletins 46
Electra 50
Engineering 56
Lighting and Wiring 64
Sales 70
Editorials 80
Associations 82
News 96
Profiles 120

Cover Photo: Primary and secondary Okonite cable leads for mobile substation are shown mounted on special factory-built reels ready for shipment.

CHANGE OF ADDRESS

Circulation Manager,
Electrical West,
68 Post St.
San Francisco 4, Calif.

Please change my address

From .....

To .....

Signed .....

People

Stanley Rapp

protection engineer of the Pacific Telephone & Telegraph Co., who outlines plans of the Bell system for supplying rural telephone service in sparcely settled areas via power-line carrier, p. 56, is a graduate electrical engineer of the University of California. He has been with the P. T. & T. Co. since 1916 and in the engineering department since 1919. Rapp has been closely associated with the power company men of California for many years in connection with inductive and structural coordination. He has also taken an active part in the revision of the California rules for overhead line construction.

James M. Evans

contributes another in a series of three articles on the National Electrical Code in this issue, the first having appeared in October 1945, p. 115. In that he reminded that the Code is not a handbook. In this, p. 64, he tells of natural pressures put upon Code making by representatives of the various interests in the industry. As a practicing electrical engineer, Evans has designed electrical systems under Code provisions all his life, and for several years was electrical engineer for the Board of Fire Underwriters of the Pacific, in Los Angeles.

Preview

Annual Review Number

Each February issue for 26 years, ELECTRICAL WEST has summarized in graphs, tables, charts and brief reports the statistics of the industry in its various phases and interpreted the significance of those figures to each branch of the industry. The most able prophesies of the forthcoming year by those best qualified to discuss them have also been a valuable guide for all in the planning of their own programs.

For the twenty-seventh time, this will be done next month. This year the facts about the industry will be especially useful because so much is starting anew. This will be an issue all should keep handy for reference throughout the year.

When Betty Crocker talks about ironing...

MILLIONS OF WOMEN WILL LISTEN!

Betty Crocker

Before long now, Betty Crocker (world's best known home service authority) will have a fascinating subject for millions of followers. It's a new iron—an iron that will set new standards of ironing performance for homemakers . . . because its temperature is controlled not by a thermostat located up in the iron, but *by the actual ironing surface of the iron itself.*

This is General Mills TRU-HEAT control, a method and principle of heat regulation that minimizes heat loss, accelerates heat recovery so that correct, safe ironing temperatures are maintained regardless of how fast or how slow the user irons.

When Betty Crocker reveals the facts about TRU-HEAT control and all the other important, exclusive features of the General Mills Iron—you know women will *act.* They'll want the iron Betty Crocker sponsors . . . just as they now want . . . and *buy* . . . hundreds of millions of other General Mills products recommended by Betty Crocker.

WHAT TRU-HEAT CONTROL IS

TRU-HEAT control is a simple, sturdy mechanism which permits the expansion and contraction of the iron's soleplate to make and break the heating circuit. Thus the actual surface in contact with the fabric being ironed controls the ironing temperature. So sensitive is TRU-HEAT control that it holds ironing temperatures with amazing accuracy.

BETTY CROCKER IS A REGISTERED TRADE MARK OF GENERAL MILLS, INC.

GENERAL MILLS, INC., HOME APPLIANCE DEPARTMENT · MINNEAPOLIS 13, MINNESOTA

Leader has always worked towards the finest in fluorescent lighting, excellent workmanship, careful design, accurate engineering . . . for New Horizons in fluorescent lighting.

In the latest Leader success, the New Horizon Series, you will find Leader quality throughout; plus new streamlining and simplicity made possible by Slimline Tubes.

The New Horizon Series are trim, compact, streamlined; they lend themselves to modern trends of architecture and especially long in-line continuous run installations.

The New Horizon Series feature the new Slim-line F96T8 tubes and are manufactured for both Industrial and Commercial installations. There is a Leader Representative in your area with complete information on the New Horizon Series.

Distributed only through the better electrical wholesalers.

LEADER ELECTRIC MANUFACTURING CORP.

6127 NORTH BROADWAY • CHICAGO 40, ILLINOIS

★

WEST COAST FACTORY • 2040 LIVINGSTON STREET, OAKLAND 6, CALIF.

WHAT DO YOU BUY IN A CABLE?

RUBBER COPPER TIN LEAD TAR STEEL PAPER PLASTICS SYNTHETICS RESEARCH ENGINEERING & MANUFACTURING SKILL

When you buy an insulated cable, what do you expect to get for your money? Do you merely buy pounds of raw materials to be made into a cable, or do you want your dollars to buy expert know-how, advanced research, engineering and manufacturing skill?

The raw materials of an insulated wire or cable are easily obtainable but it's the manufacturing skill, the engineering know-how and the advanced research that go into the wire or cable that make these raw materials into something that you can depend upon to transmit electrical energy safely and give long life and trouble-free operation.

When you get ready to exchange your hard-earned money for a piece of insulated wire or cable, remember that Simplex is the place that specializes in advanced research, in unexcelled manufacturing skill, and in know-how brought about by over forty years of manufacturing experience.

REMEMBER, THE WORTH-WHILE ADVANCEMENTS IN CABLE CONSTRUCTION COME FIRST FROM SIMPLEX

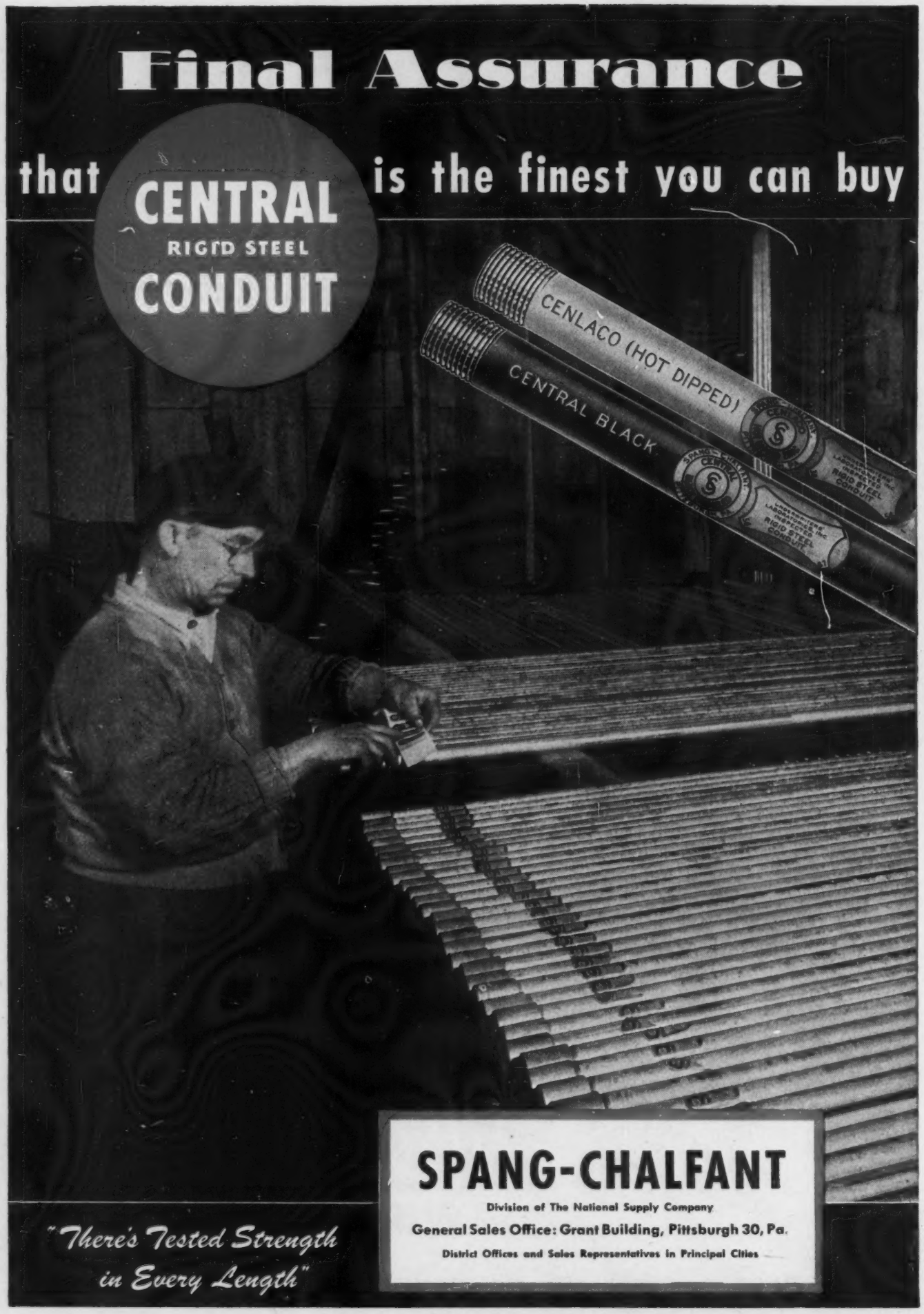
Simplex

WIRES AND CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Final Assurance

that CENTRAL RIGID STEEL CONDUIT is the finest you can buy



"There's Tested Strength in Every Length"

SPANG-CHALFANT

Division of The National Supply Company

General Sales Office: Grant Building, Pittsburgh 30, Pa.

District Offices and Sales Representatives in Principal Cities

FWD Model HA Trucks, equipped with 8:25" x 20" dual tires, standard FWD "H" axles and 4" silent chain transfer cases, service the entire P.G.&E. territory.

Mountain Ranging FWD FLEET INCREASED TO 35

Because of their merit . . . because of proved-in-service performance over many years . . . FWD four-wheel-drive trucks have been added repeatedly to the fleet of The Pacific Gas & Electric Company, San Francisco, California.

Shortly after World War I, P.G.&E. bought its first FWD . . . and now operates 35! Eight new Model YU and nine new Model HA FWDs were added in 1945. FWDs have "made good" in severe service . . . thousands of miles of lines have been installed and serviced, requiring truck travel over extremely rugged, off-the-highway mountain terrain . . . up and down the Sierra-Nevada mountain range, at elevations up to 7,000 feet.

Utility companies are converting more and more to FWDs to aid them to maintain unfailing service . . . to increase the work range and capacity of crews and equipment . . . to get through to location, on or off the highways. With full power and traction on four driving wheels, rugged construction, better hill-climbing ability and greater safety, FWDs have won top rank as superior line-construction and maintenance trucks.

AVAILABLE NOW . . . specially equipped for utility duty . . . see your nearest authorized FWD dealer, or write to:

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wisconsin

Canadian Factory: **KITCHENER, ONT.**

FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

FWD Distributors: ARIZONA—Arizona-Cedar Rapids Co., 401 N. First St., Phoenix; CALIFORNIA—The Four Wheel Drive Auto Co., 1339 Santa Fe Ave., Los Angeles 21 and FWD Pacific Co., 469 Bryant St., San Francisco 7; COLORADO—Liberty Trucks & Parts Co., P. O. Box 1889, Denver 1; IDAHO—Intermountain Equipment Company, Broadway at Myrtle St., Boise; MONTANA—Steffeck Equipment Co., 11 E. Cutler St., Helena; NEVADA—Allied Equipment Co., Reno; NEW MEXICO—The Myers Company, Las Cruces; OKLAHOMA—Halliburton Oil Well Cementing Co., P. O. Drawer 471, Duncan; OREGON—Feenaughty Machinery Co., 112 S. E. Belmont St., Portland 14; UTAH—Cate Equipment Co., 49 E. 9th So., Salt Lake City; WASHINGTON—Feenaughty Machinery Co., 1028 6th Ave., So. Seattle 2, Glenn Carrington & Co., 91 Columbia St., Seattle and Feenaughty Machinery Co., 715 N. Division St., Spokane; WYOMING—Wortham Machinery Co.,

KLEINS
FOR MEN WHO
WANT THE BEST
Every good workman appreciates high quality in the tools and equipment he uses. To a lineman, however, this regard for quality is more than admiration for fine craftsmanship. The lineman daily trusts his very life to his safety strap, belt and climbers—and under such conditions high quality is more than a matter of pride.
Good workmen know that there's no substitute for experience. It is the years of expert craftsmanship back of every piece of Klein equipment that make Klein belts and safety straps—Klein climbers and grips—Klein pliers and wrenches the first choice of linemen today as they have been "since 1857."
ASK YOUR SUPPLIER
Foreign Distributor: International Standard Electric Corp., New York
This book on the care and safe use of tools will be sent on request.
Since 1857
KLEIN TOOLS
TOOLS
KLEIN
Mathias Established 1857 KLEIN & Sons Chicago, Ill., U.S.A.
3200 BELMONT AVENUE CHICAGO

BOOKS

you may want

ELECTRICAL COILS AND CONDUCTORS, Their Electrical Characteristics and Theory, by Herbert Bristol Dwight, 348 pages, 5½x8½, many figures, index. McGraw-Hill Book Co., $5.

Engineers are often faced with the solutions of problems that do not fall within the scope of the conventional textbook on Electrical Engineering. In such cases, much library research work must be undertaken to attempt to find a suitable method of solution.

This book is particularly valuable to those engineers who work with design and application problems that of their nature are uncommon. Some of the material described with the book gives the method of solution for transmission line sag calculations, reactance of stranded, tubular and rectangular conductors; skin and proximity effect in conductors; mutual inductance of fine wire circles, coaxial solenoids and two thin disc coils in air; mechanical forces between coaxial coils without iron, coils with parallel axis and cylindrical transformer coils.

Other chapters are devoted to operation of delta and V transformer banks; eddy current loss in transformer windings and armature coils; computation of heat transfer; solution of inverse functions of complex quantities and graphical flux plotting exercise.

The author has included material that is ordinarily found in classroom lectures and in laboratory research work. This book is recommended to those who must present solutions for unusual problems.—F. S. B.

ELECTRONICS DICTIONARY, by Nelson M. Cooks and John Markus, 433 pages, 9x6, McGraw-Hill Book Co.

An up-to-date, well illustrated glossary containing clear-cut and accurate definitions of nearly 6,500 terms used in radio, television, industrial electronics, communications, facsimile, sound recording, etc. This authoritative compilation of readily understood definitions constitutes the most comprehensive dictionary available in this field. More than 600 appropriate diagrams and sketches greatly enhance the book's usefulness and interest. The authors also have attempted to set up a complete and consistent abbreviating policy for electronic terms. Those who like a simplified one-abbreviation-per-term policy can adopt the book as a one-volume style guide for both engineering and stenographic use. A serious attempt was made to standardize the spelling of compound terms, giving consideration to common usage, future trends and grammatical rules, as well as to the style in the latest Merriam-Webster unabridged dictionary. The book fills a long-felt need for a work of this kind in the field covered.—W. C. H.

PRACTICAL MARINE ELECTRICITY, by S. N. Le Count and H. S. Dusenbery, MacMillan, 258 pages, 6x9, $3.50.

Out of the war and the experience gained at Moore Dry Dock Co., Oakland, Calif., comes much of this essential material on new practices in applying electricity to ships. The book combines brief treatment of electrical fundamentals with detailed and well illustrated expositions of power, lighting, and communications applications in modern shipbuilding practice.

Bigger Store Lighting Load is yours if you follow this New G-E Program!

IT'S READY NOW!

Be sure to ask your G-E Lamp representative to show you the new General Electric 1946 store lighting program, outlining your opportunity in this industry-wide campaign for higher standards of store lighting.

See all the material G-E has prepared for you —motion pictures in full color, sales training courses, a salesman's presentation, booklets, direct mail and many other sales aids. One hour invested in study of this program now will repay you with thousands of kilowatt hours in additional load.

See your G-E Lamp representative today. General Electric Lamp Department, Nela Park, Cleveland 12, Ohio.

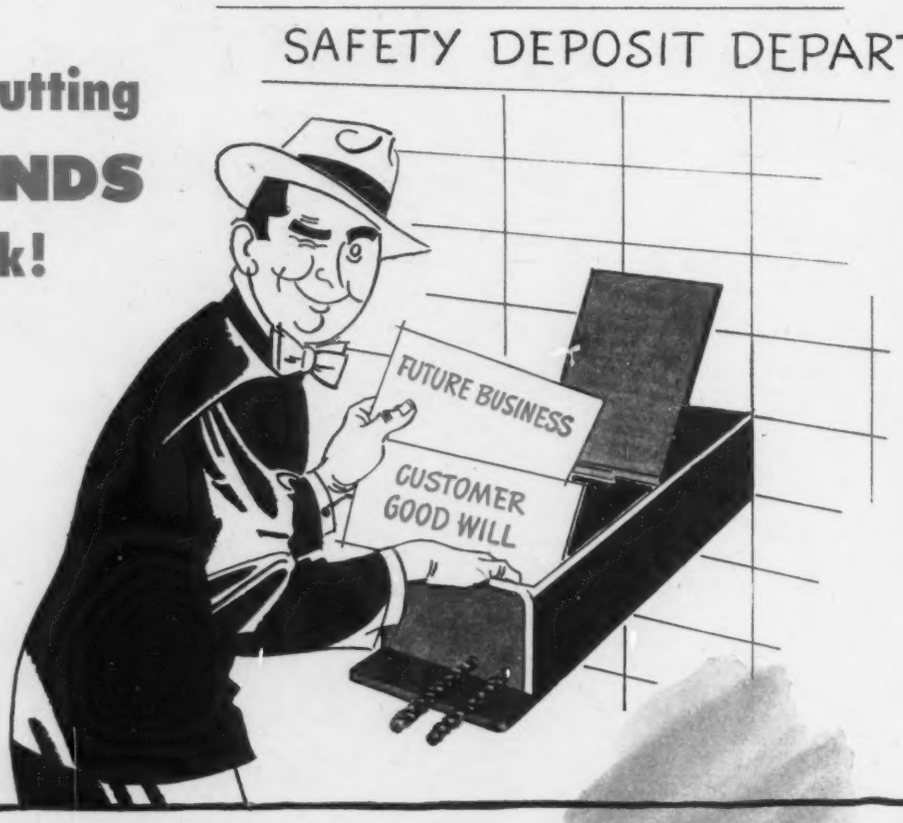
G·E LAMPS

GENERAL ELECTRIC

Research is Always at Work to Improve G-E Lamps and Make Them

STAY BRIGHTER LONGER !

Just like putting U. S. BONDS in the Bank!



Certified Ballasts build reserves of customer good will

When selling gets tougher, you'll be glad you had the foresight to specialize on Fluorescent Fixtures equipped with Certified Ballasts. Because of their longer span of top performance and reduced service troubles, they build the kind of customer satisfaction that brings repeat business *when it counts most.* That's the reason why, as soon as they are available, you'll want to equip all your fixtures with *Certified* Ballasts.

Certified Ballasts are built to definite specifications assuring better lamp performance. Leading fluorescent tube makers guarantee lamp performance in Certified Ballast equipped fixtures.

Certified Ballasts are rigorously tested by the impartial Electrical Testing Laboratories, Inc., before they can be *certified* as meeting the Ballast specifications.

Certified Ballast *Manufacturers*

MAKERS OF BALLASTS FOR CERTIFIED FLUORESCENT LIGHTING FIXTURES

CHICAGO TRANSFORMER CORP.
3501 Addison St., Chicago, Illinois

DONGAN ELECTRIC MFG. CO.
2987-3001 Franklin St., Detroit, Mich.

GENERAL ELECTRIC CO.
Specialty Transformer Section
1635 Broadway, Fort Wayne, Ind.

JEFFERSON ELECTRIC CO.
Bellwood, Illinois

SOLA ELECTRIC CO.
2525 Clybourn Ave., Chicago 14, Illinois

WHEELER INSULATED WIRE CO.
378 Washington Ave.,
Bridgeport, Conn.

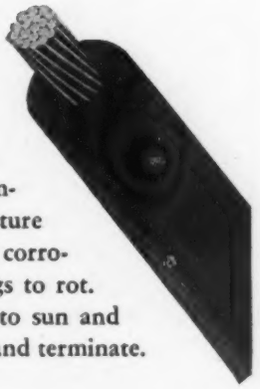
4 OF MANY CABLES

engineered by

OKONITE

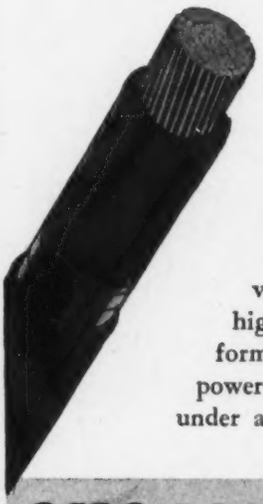
OKOLITE-OKOPRENE

Versatile, low in maintenance cost, Okolite-Okoprene* is designed for service up to 5,000 volts, for control wiring, lighting and power circuits. Its Okolite oil-base insulation has excellent electrical properties. Its outer protective jacket of non-flammable Okoprene resists moisture and oil as well as abrasion and corrosion. Contains no fibrous coverings to rot. May be buried in earth, exposed to sun and elements. Simple to handle, splice and terminate.



*Patent No. 2,312,058

OKOLITE-OKOPRENE
for high voltages

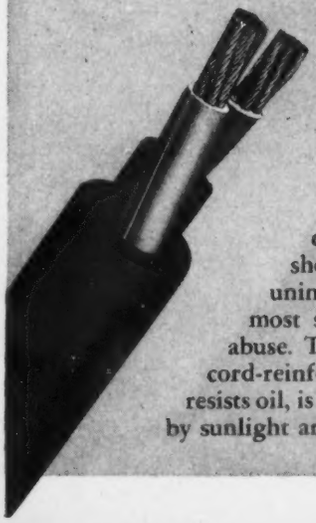


Okolite-Okoprene high voltage cables are supplied for service up to 35,000 volts a. c.—110,000 volts d. c. with protective shielding as conditions demand. Hundreds of thousands of feet of Okolite-insulated high voltage cables for generator leads, high voltage feeders to motors, transformer leads, submarine cables and other power circuits have proved their efficiency under all kinds of operating conditions.

VARNISHED CAMBRIC

Okonite varnished cambric insulated wires and cables for operations up to 28,000 volts comprise a complete line for all types of power circuits. A wide range of outer protective coverings is available. These outer coverings include fibrous sheaths, lead sheaths, interlocked metallic tape and armor wire, asbestos braid, and flame retardant cotton braid as well as Okoprene and other non-metallic synthetic sheaths.

OKOCORD PORTABLE CABLES



Extra flexible stranding is standard in all Okocord portable cords and cables designed for leads on electrical welding equipment, tools, portable equipment, magnet cranes, dredges and electric shovels. Designed to transmit uninterrupted power under the most severe conditions of external abuse. This cable is furnished with a cord-reinforced Okoprene jacket that resists oil, is non-flammable and unaffected by sunlight and exposure.

Engineers in all branches of industry are invited to bring their problems of electrical transmission and distribution to Okonite engineers. By combining their experiences, the correct selection of wires and cables is made easy, low maintenance and long life assured. The Okonite Company, Passaic, New Jersey.

OKONITE

OKONITE SINCE 1878

insulated wires and cables

4182

Flexibility-Plus !

BULLDOG UNIVERSAL *Trol-E-Duct*

LIGHT—ALL YOU WANT—WHERE YOU WANT IT!

Results from plant lighting—as it affects quality and quantity of work—depend on the *flexibility* and dependability of the system from which it taps its current.

Here is where BullDog's nearly 50 years' leadership in the electrical distribution field really counts. Universal Trol-E-Duct—pioneered by BullDog and proved by industry—is the best way to provide *continuous* electrical outlets for any type of lighting, *wherever* and *whenever* needed.

Standardized and pre-fabricated in all its parts, it is completely adaptable—no re-wiring when machines are moved or entire plant layouts revised. It's 100% salvable, too; the whole system can be dismantled easily and without loss for re-installation elsewhere.

Why get along with old-style FIXED electrical outlets in *your* plant? Investigate Universal Trol-E-Duct—adaptable to fluorescent, mercury vapor or incandescent lighting. Consult BullDog field engineers or write us direct.

BUY VICTORY BONDS

SALVAGE PAPER

DETROIT 32, MICHIGAN
In Canada:
BullDog Electric Products of
Canada, Ltd., Toronto.
Field Offices in All Principal Cities.

BULLDOG

ELECTRIC PRODUCTS COMPANY

Also Manufacturers of
Vacu-Break Safety Switches — SafToFuse Panelboards—Switchboards—Circuit Master Breakers — BUStribution Duct for "plug-in" power — Industrial Trol-E-Duct for movable "loads."

BULLDOG PRODUCTS ARE SOLD AND DISTRIBUTED BY THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

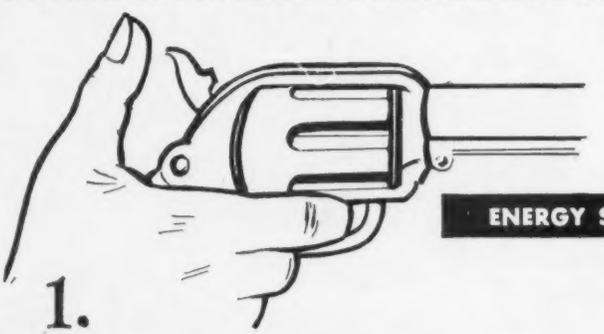
Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue
Portland, Oregon, Tel. Garfield 2844

Safety Switchboard Company
1445 Stevenson St.
San Francisco, Calif., Tel. Hemlock 2470

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street
Los Angeles, Calif., Tel. Jefferson 2224

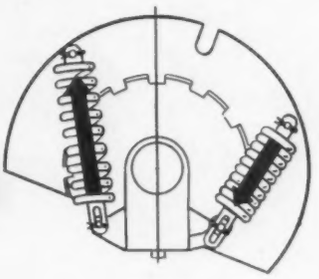
Secret of The "Quick-Break" Principle

HERE'S WHAT IT IS — HERE'S HOW IT GIVES YOU CLOSER REGULATION AT LESS COST WITH ALLIS-CHALMERS 5/8% STEP REGULATORS



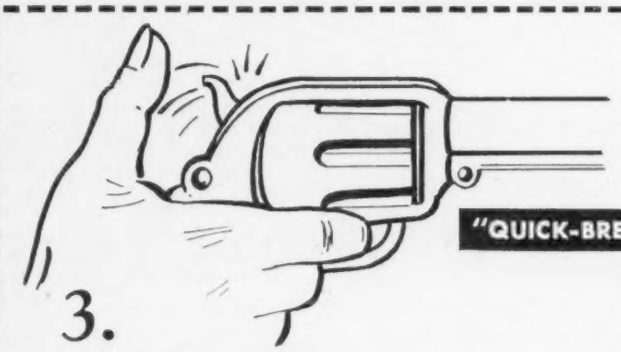
1.

THE HAMMER MECHANISM of a pistol illustrates the principle of storing energy for sudden application. A reserve of energy is built up as the pistol is cocked by pulling back the hammer.



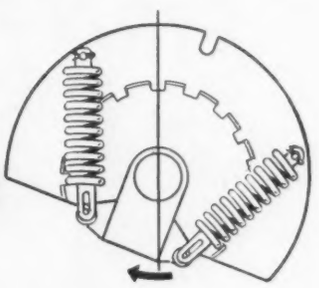
2.

SIMILARLY, The Allis-Chalmers tap-changing mechanism applies the "Quick-Break" principle, by gradually storing up energy for a quick tap change, in a pair of *balanced* driving springs.



3.

WHEN COCKED, the hammer mechanism of the pistol can release its energy in a split second . . . piercing the firing cap of the bullet. This is "Quick-Break" energy application, just the opposite of slow-breaking application of energy as it is generated.



4.

IN THE A-C tap-changing mechanism, quick release of built-up spring energy separates contacts with a *snap action,* in contrast to slow-breaking types of mechanism. Since the arc exists for only a *brief instant,* arcing doesn't burn or pit contacts.

"QUICK-BREAK" PRINCIPLE MEANS LOW MAINTENANCE, EXCEPTIONALLY LONG CONTACT LIFE

WITH ARCING reduced to a minimum by "Quick-Break" contact separation, contacts on Allis-Chalmers 5/8% Step Regulators may be expected to last as long as the regulator is in use. As a matter of record, no current-carrying contact has ever been replaced on an Allis-Chalmers 5/8% Step Regulator, due to deterioration in normal service.

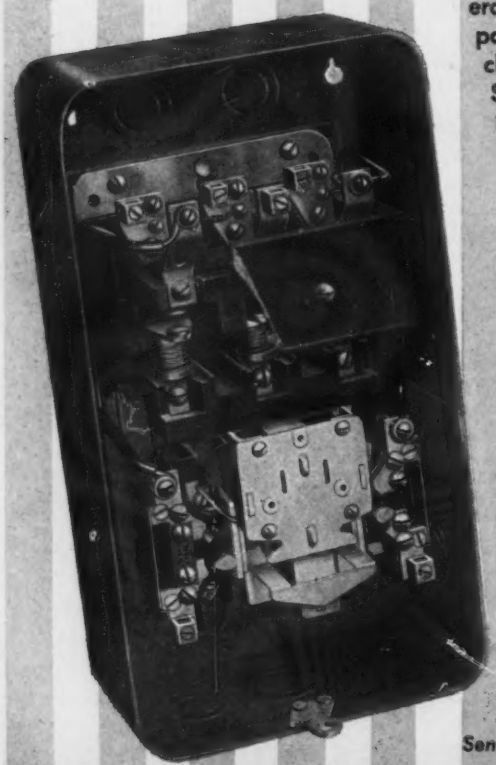
OTHER LOW MAINTENANCE PRINCIPLES: 1) Unit construction of A-C 5/8% Step Regulators, eliminates 78 bolted connections; 2) Oil immersion of all moving parts keeps parts dust-free, eliminates need for lubrication; 3) Feather-Touch control, with voltage integration, eliminates holding coils, sealing-in switches.

Get the full story on economical 5/8% Step Regulators for all voltages by writing for Bulletins B6056A and B6065, ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 1932

Federal's Noark Magnetic Starter
Is completely different and plenty smarter
Equipped with action that's ball-bearing
For safe control and longer wearing

Federal NOARK
Magnetic Motor Starters



There's only one moving part in Federal Noark Controls . . . and that part rolls on ball bearings—an exclusive Federal feature! Result? Smooth, faster making and breaking of contact, accurate action . . . less friction . . . longer life. Here are more reasons for specifying Federal starters:

- Double break pure silver contacts held by a single screw for ready replacement.
- Heavy arc barriers located for strength, flashover resistance, high arc rupturing.
- Molded parts have asbestos base with non-carbonizing inorganic binder.
- Coils readily changeable—just remove retainer spring, loosen yoke, take out magnet.
- Overload relays—*combination hand and automatic reset.* Bimetalic type. Originated by Federal.
- Heaters frontmounted, accessible; trip ampere stamped on units.

Send for your copy of the FEDERALOG.

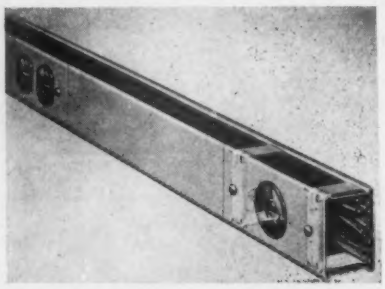
FEDERAL ELECTRIC PRODUCTS COMPANY, INC.
EXECUTIVE OFFICES: 50 PARIS ST., NEWARK 5, N. J. · PLANTS: HARTFORD, CONN.; · NEWARK, N. J.

PRODUCTS

that are news

Raceway (100)

National Electric Products Corp. has a new two-piece surface raceway of base and capping, called Surfaceduct No. 1700. Measuring 1⅝ x 2⅛ in., this raceway embodies the lay-in principle and, according to the manufacturer, a minimum number of fittings provides a system to serve electrical requirements up to 60-amp. loads. A patented arch type bridge within the raceway is said to allow maximum wire capacity, to retain the wires during installation, lock the snap-on cover and serve as a method of installing more than 300 approved devices. Four of



these bridges are included with each 10-ft. length.

Without devices, this product has an Underwriters' rated capacity of 6 No. 6; 10 No. 8; 10 No. 12 or No. 14 wires. When devices are incorporated within the raceway, rated capacity is 4 No. 6; 5 No. 8; 10 No. 10, 12 or 14 wires. A combination T and offset service fitting permits installation of devices in an offset position from the raceway. Surface duct No. 1700 has ½- and ¾-in. knockout and mounting holes every 12 in. along the base. Suspension installations are made by use of hangers. Side feeds are available for interconnections to any type of wiring system.

Plastic Coating (101)

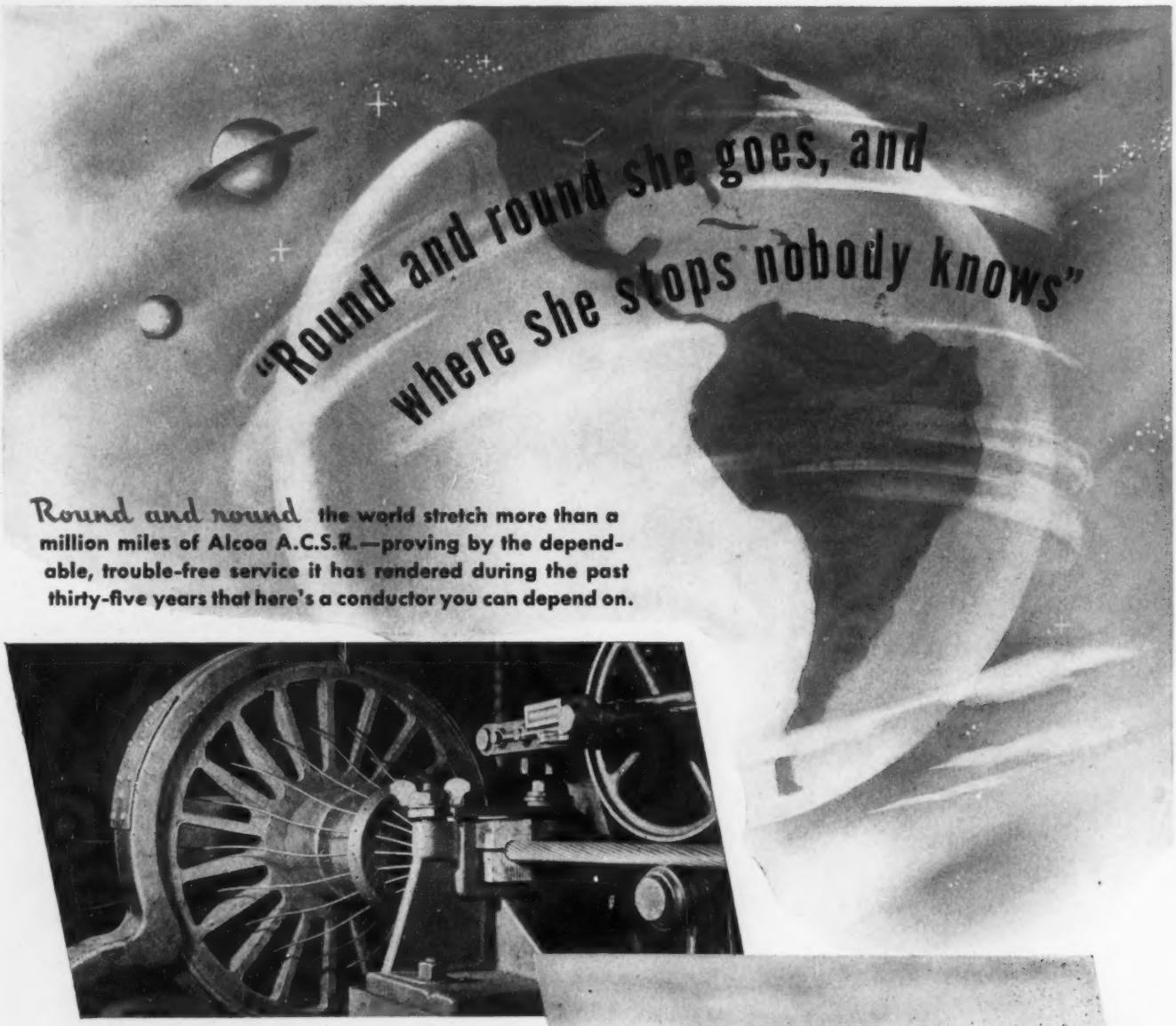
A new plastic air-drying coating developed by Baker Synthetics, Inc., is said to be practically impermeable, completely resistant to most acids, all alkalies and many chemicals, to bond to practically any clean surface, to be electrolytically impervious. A combined thermoplastic and thermosetting film, this coating is called Corrosite.

Welder (102)

Lincoln Electric Co. has developed a low-priced welder for farm and shop use. This Fleet-Arc Jr. is for 230 volts, single phase; has a maximum input current of 35 amp.; can be used with the standard 3-kva. transformer. Current range is from 20 amp. at 20 volts to 180 amp at 25 volts welding duty. It will handle electrodes from 1/16 to 5/32 in. diameter.

A-C Test Set (103)

General Electric has a new 15,000-volt, stationary, a-c test set, designed for fixed-location testing of medium-sized motors, generators, transformers, insulators and other equipment. It operates from any single-phase, 60-cycle, 115-volt supply circuit and provides variable test voltages up to 15,000 volts a-c, with a capacity of 2 kva.



Round and round the world stretch more than a million miles of Alcoa A.C.S.R.—proving by the dependable, trouble-free service it has rendered during the past thirty-five years that here's a conductor you can depend on.

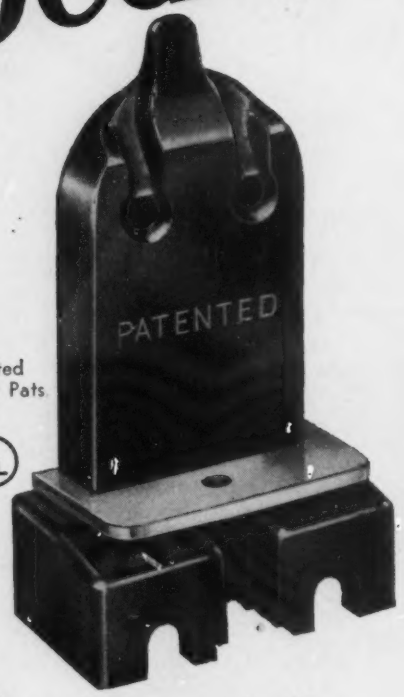
Round and round month after month, go the standing machines in Alcoa's wire mills as they form a seemingly endless number of miles of Aluminum Cable Steel Reinforced—aluminum for high electrical conductivity, steel for high strength.

Round and round go the reels as they pay out mile after mile of cable on rural lines and hi-lines being built all over the country.

For help on engineering your lines, consult Alcoa, makers of Alcoa A.C.S.R. and fittings. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA A-C-S-R
ALUMINUM CABLE STEEL REINFORCED

Unbeatables



Patented
Other Pats.
Pend.

Pat. Nos.
2200443
2228210

Lloyd Flex-Loc lampholder Automatic Starter

FLEX-LOC Lamp Holder

FLEXIBLE — Automatic — self-adjusting to variations in lengths of lamps or spacing of mounting holes. Engineered to fit all standard spacings.

AUTOMATIC LOCK is positive. No need for extra locking devices. Lamp cannot fall out. Contacts cannot loosen.

EASY insertion and removal. No twisting. No turning. No fussing to seat lamp in holder. FLEX-LOC does the work automatically. As lamp pins slide up to terminal holes, holder is flexed outward. As pins enter holes, holder snaps inward, internal spring returning to normal.

PERFECT ELECTRICAL CONTACT — Newly designed, patented terminals grip BOTH sides of lamp pins . . . make sure and positive contact.

Listed and Approved by Underwriters' Laboratories Inc.

Automatic Starter

Positively cuts out deactivated, flickering, blinking lamps.

When trouble is detected the starter automatically cuts off current to the ballast and lamp.

Gives long life to ballast because defective lamp is locked out. Prevents overheating.

When Lloyd AUTOMATIC locks out defective lamp—turn off the current—remove defective lamp—put in a new lamp. Allow at least one minute to make above changes. Turn on current. The starter automatically lights the new lamp.

The life of the AUTOMATIC starter is many times greater than that of the average lamp.

It saves maintenance costs and power consumption, protects and insures longer life to ballast and lamp.

Certified by Electrical Testing Lab., Spec. 6

Lloyd Policy Insures Quality

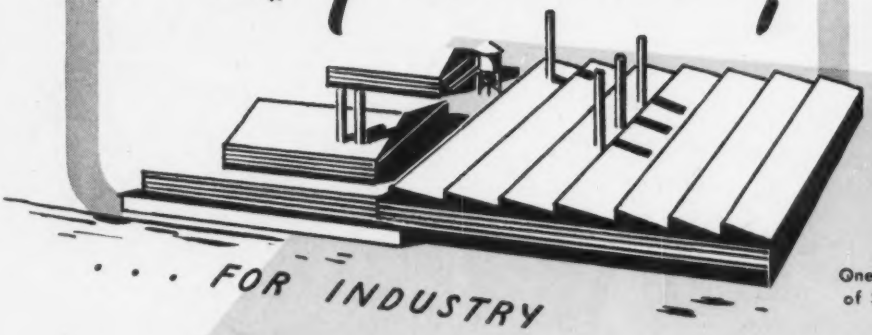
LLOYD PRODUCTS CO.

Providence 5, R. I.

Branch Offices and Warehouses in 27 Leading Cities

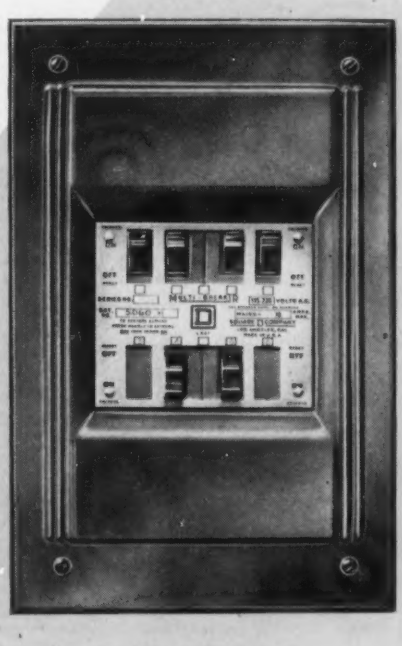
SQUARE D MULTI-BREAKERS

Eliminate fuse Replacement!



. . . FOR INDUSTRY

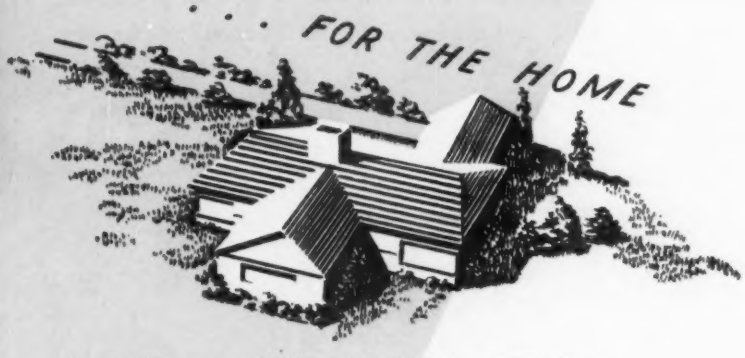
One of the many types of Square D Industrial Multi-Breakers.



Square D Multi-Breaker designed for use in homes and apartment buildings.

THE ADVANTAGES of the Square D Multi-Breaker are many and far reaching:

- It completely eliminates the old-fashioned and out-moded fuse box systems;
- It provides immediate restoration of service after short circuits or overloads occur;
- It reduces maintenance costs since no replacement of parts is necessary;
- It permits harmless momentary overloads to pass without causing the unit to disconnect the circuit;
- It assures complete electrical efficiency in modern industrial and home life.



. . . FOR THE HOME

A call to your nearest Square D Field Engineer or Distributor will bring expert advice as to the type of Square D Multi-Breaker most advantageous to your particular needs.

SQUARE D COMPANY

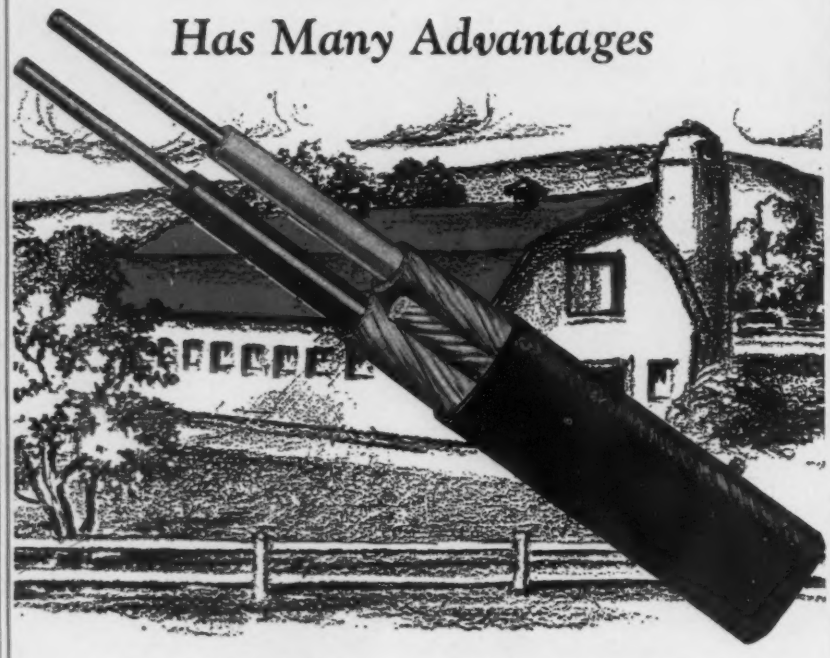
LOS ANGELES DETROIT · MILWAUKEE

CRESFLEX

TYPE TX

NON-METALLIC SHEATHED CABLE

Has Many Advantages



A SAFE, PERMANENT low cost cable for interior wiring. The use of SYNTHOL Type T conductors results in a smaller, lighter weight cable, which makes it easier to install and takes less space. The SYNTHOL thermoplastic insulation on the conductors has long life, high dielectric and mechanical strength, and is extremely resistant to moisture, acids, alkali and mildew. Will not burn and is free and clean stripping.

Recommended for farm and rural buildings, as well as for all types of residential construction.

CRESCENT

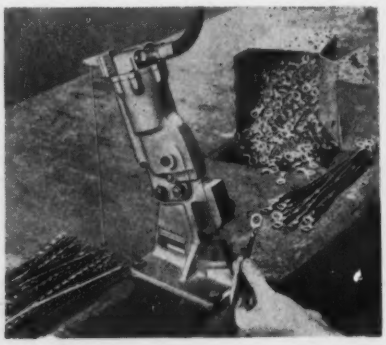
WIRE and CABLE

NEMA

CRESCENT INSULATED WIRE & CABLE CO.

TRENTON, N. J.

Tool (104)



Burndy has a new bench mounted pneumatic "Hypress" tool for installing its indent type connectors on small electrical wire and cable. A single pair of dies accommodates three conductor sizes, the manufacturer states, and dies now available will take Hydent connectors No. 18, 14 and 10 for wire and cable sizes from No. 22 to 10, inclusive. This tool, which uses air pressure for the power source, is a companion to the recently announced Burndy Hytool, a foot operated mechanical device.

Magnetic Contactor (105)

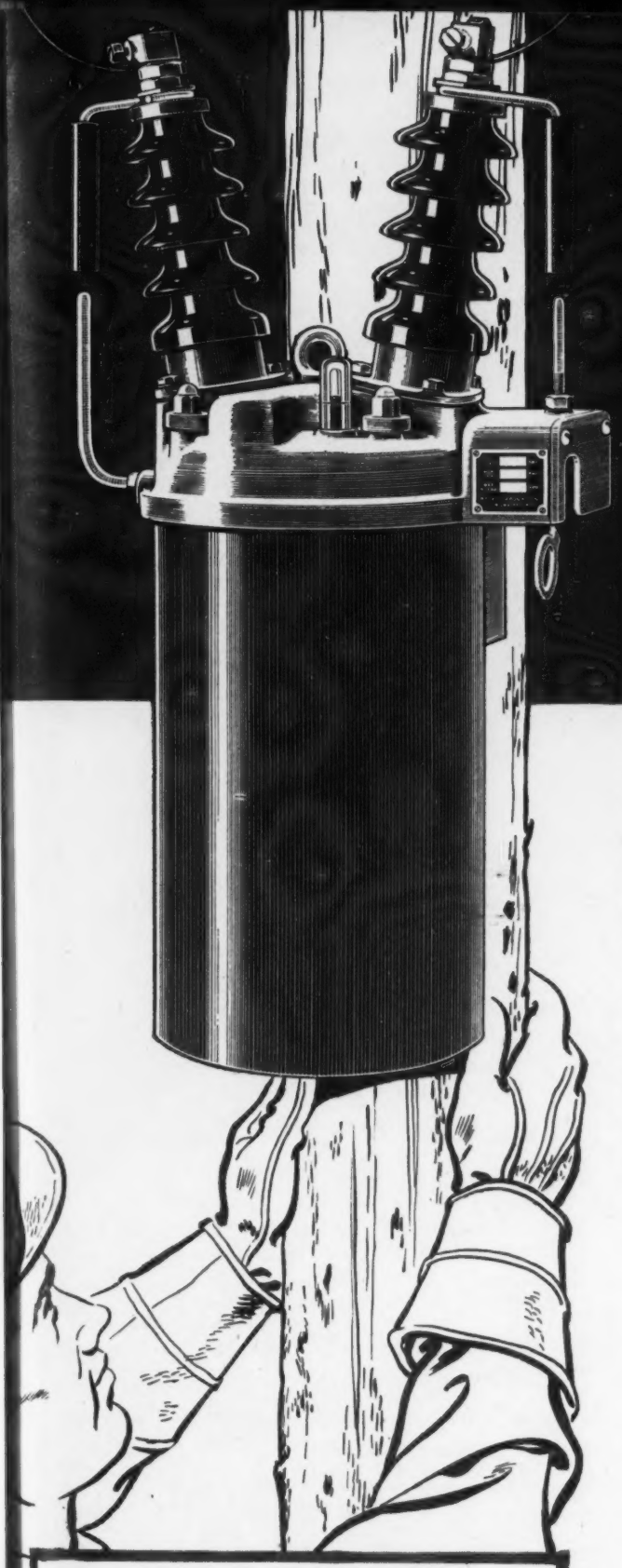
For marine and mine applications and for use where space is limited, Westinghouse has introduced a new type M, d-c, single-pole magnetic contactor. Rear or front connected units are available. The contactor is entirely assembled on a formed frame, which also serves as a path for the magnetic flux. According to the manufacturer, the small frame contactors in this line are limited to applications in which the coil voltage and the voltage of the circuit being interrupted do not exceed 250 volts; the deep frame contactors, which provide greater winding space for the operating coil, are suitable for applications up to 600 volts. Operating coils are rated for continuous duty and will operate the contactors at 80 to 110% of rated voltage. These contactors are insulated for a maximum potential difference of 600 volts among parts.

Inspection Lamp (106)

A miniature inspection lamp is being made by Harmon & Co. for equipment having openings as small as 5/16 of an inch. Power is supplied through a rubber insulated wire cable to a transformer enclosed in a bakelite handle. A special model is available for use where there is danger of explosion or fire. The standard set has a built-in push button type transformer lamp handle constructed for a-c, a 10-ft. plug-in cord, two rigid and two flexible extensions and four screw-in miniature tungsten bulbs in varying sizes. Additional extensions and special lamps and brackets are available.

Resistors (107)

Shallcross has added a 1.5-watt and an 0.5-watt unit to its line of hermetically sealed resistors. The 1.5-watt resistor, known as type 1105, is designed for style RB14A under JAN specification R93; is 2-1/16 in. long, ⅞ in. in diameter and its maximum ratings, wound with nickel chromium wire, are 1 megohm resistance and 1,000 volts. Type 1101, the 0.5-watt unit, is designed for style RB12A under JAN specification R93; is ⅞ in. long and ⅞ in. in diameter; maximum resistance value is 350,000 ohms, maximum voltage, 420.



KYLE OIL CIRCUIT RECLOSERS ARE SAFE 3 WAYS

TO GIVE GREATER PROTECTION TO THE LINEMAN

The Kyle Type "H" Oil Circuit Recloser gives greater protection to the lineman, greater protection to the recloser, and thereby greater protection to your lines and service.

Protection of the lineman is provided by these triple-safe features:

1. **The Head of the Recloser is dead.** The entire top, consisting of the operating handle and cover, contain no live surfaces. The two line terminals are the only "hot" spots.

2. **The Operating Handle is dead.** The operating mechanism is trip-free of the handle. It is impossible for a blow from the mechanism to be imparted to the operator.

3. **The Tank is dead.** There are no live surfaces on the tank. It is entirely dead and provision is made for grounding. Except for the lead-in bushings AT THE TOP, the entire recloser is dead.

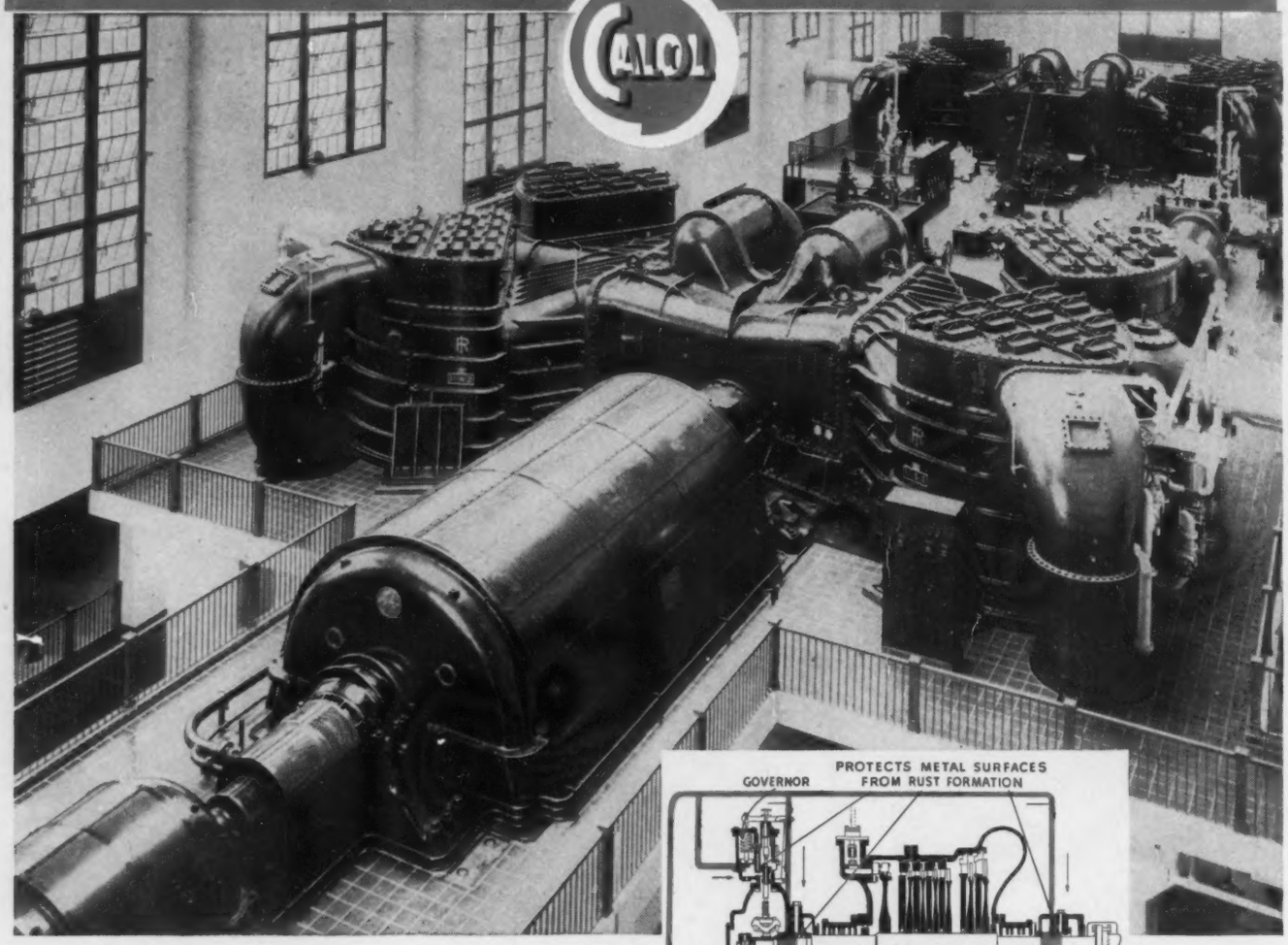
Damage to the recloser from continued overheating under severe overload is impossible with the Kyle Oil Circuit Recloser. A thermo-trip device will automatically lock-out the recloser. Heating is reduced by the use of large coil wire which reduces the IR drop through the recloser. Heat is carried away rapidly by the metal tank. The normal position of the Kyle Oil Circuit Recloser is the safe, open, position. Any mechanical failure opens the recloser. This prevents accidental reclosure and insures complete protection to anyone working on the line.

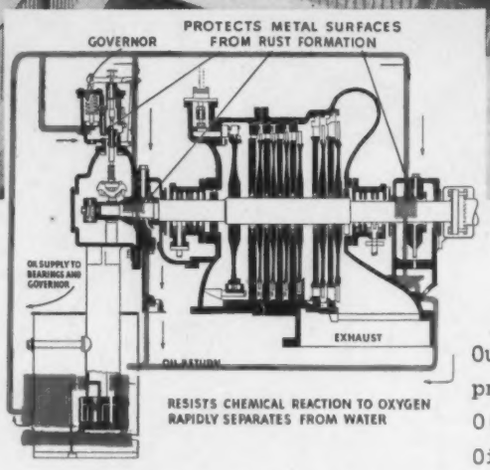
Ask your Line Material Representative for full information on Kyle Type "H" Oil Circuit Reclosers. Let him show you how they will improve your service to customers . . . earn more revenue for you.

MADE BY KYLE CORPORATION SOUTH MILWAUKEE WISCONSIN

THE LINE MATERIAL COMPANY

Major power company picks Calol Turbine Oils





Southern California Edison Company, one of the largest producers and distributors of electric power in the country, has been using Calol Turbine Oils in steam turbines installed in the No. 3 Plant of its Long Beach Steam Station, for the past sixteen years.

The rapid expansion of industry has resulted in the installation of larger and improved turbines by such concerns as Southern California Edison. Keeping pace with these developments, Standard of California has constantly improved its lubricants to meet the requirements of modern equipment.

Our new improved Calol OC Turbine Oils are outstanding examples of this progressiveness. These unusual oils contain an oxidation inhibitor and a corrosion inhibitor. They eliminate rusting and provide economical, gum and sludge-trouble-free lubrication in the toughest kind of service.

There is a proper grade of Calol OC Turbine Oil for every condition of turbine lubrication. This oil, in every grade, meets the exacting specifications of the leading turbine manufacturers.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif., or California Commercial Company, 30 Rockefeller Plaza, New York 20, N. Y.

FOR EVERY JOB A **STANDARD OF CALIFORNIA** TEST-PROVED PRODUCT

4 RANGE FEATURES THAT PUT G-E WAY AHEAD!

No other range has all the wonderful, saleable features the new G-E range offers! Nationally advertised price, too!

We could talk all day about the beauty and quality of the new G-E Range . . . and the *dozens* of great features it has!

But here are four stand-outs that put this marvelous new G-E Range far out in front of competition. Four of the *many* reasons why 2½ times more women prefer G-E than any other range.*

We're pushing these G-E exclusives in national advertising. They're quick selling points for *you* to push! General Electric Co., Appliance & Merchandise Dept., Bridgeport, Conn.

*The result of 8 recent independent national surveys.

• Calrod Units—for G-E "Speed Cooking"

Really *fast* — these clean, efficient Calrod Units! They're what makes G-E "Speed Cooking" possible, and *only* G-E offers a range equipped with them *throughout!*

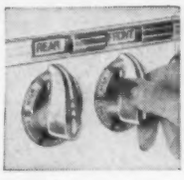
Five cooking heats with Calrod. Always the same, always controlled. Of the millions of Calrod units that have been in service since 1932, less than ½ of 1% have been returned to us because of failure, a record unmatched and unparalleled in the industry.

• Tripl-Oven—3 Ovens in 1!

Women go for this oven—and *only* G-E has it! Master Oven, big enough for two 15-lb. turkeys. Inside it, a Super Broiler, with radiant, charcoal-type broiling. And a Speed Oven that heats to 400 degrees in 5½ minutes . . . *faster than any other range oven!*

• No-Stain Oven Vent—for cleaner kitchens!

Another G-E exclusive! Cleverly placed oven vent carries cooking vapors into an under-the-surface drip pan. Walls, curtains, ceilings stay brighter.



• Tel-A-Cook Lights—for added convenience!

Each cooking speed is indicated by a different colored light on the control panel. Tells at a glance what heat's on and where. A big safety and convenience feature that *only* G-E has!

For the first time! A nationally advertised price on G-E Ranges!

Now we can advertise delivered prices on G-E Ranges with Excise Tax included—another big sales help for you! It's easy to see the advantages of this new plan . . .

1. It will establish the competitive nature of G-E Range prices.
2. It will build consumers' confidence in G-E retail prices.
3. It will show that new prices are identical with 1942 prices for similar models.
4. Excise tax and delivery cost included make an extra selling point.

Here are the new national G-E Range prices! As you see, they're planned to get women flocking in to *buy*. So push G-E Ranges to the hilt in your store!

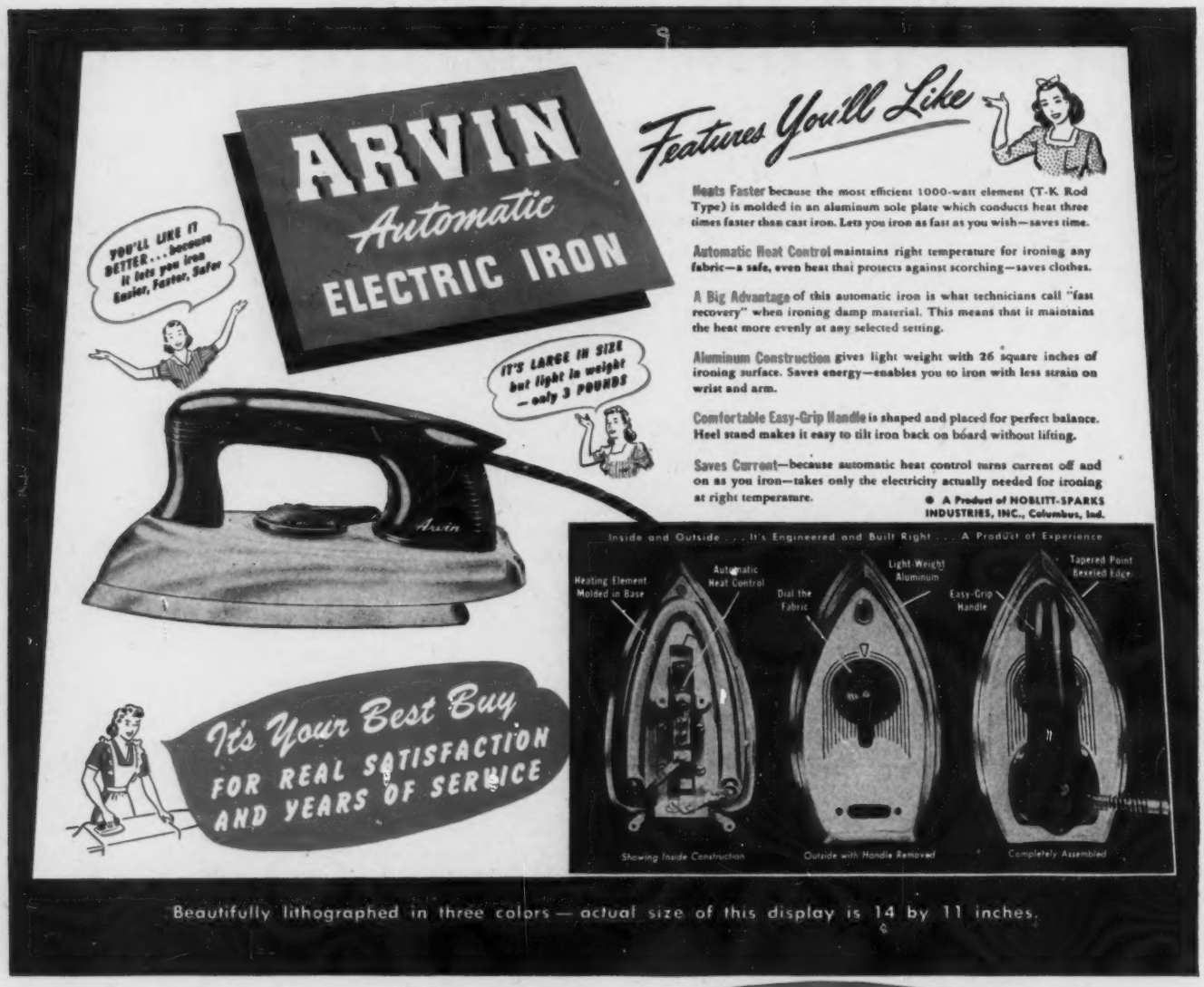
G-E Leader	**$116.95**
G-E Airliner	**$177.75**
G-E Stratoliner	**$259.75**

AUTOMATIC ELECTRIC **RANGES**

GENERAL ELECTRIC

"THE APPLIANCES MOST WOMEN WANT MOST"

Tell your customers to listen to Art Linkletter, in "The G-E House Party," every afternoon, Monday through Friday, 4 p. m., E.S.T., CBS.


ARVIN
Automatic
ELECTRIC IRON
YOU'LL LIKE IT BETTER... because it lets you iron Easier, Faster, Safer
IT'S LARGE IN SIZE but light in weight — only 3 POUNDS
Features You'll Like
Heats Faster because the most efficient 1000-watt element (T-K Rod Type) is molded in an aluminum sole plate which conducts heat three times faster than cast iron. Lets you iron as fast as you wish—saves time.
Automatic Heat Control maintains right temperature for ironing any fabric—a safe, even heat that protects against scorching—saves clothes.
A Big Advantage of this automatic iron is what technicians call "fast recovery" when ironing damp material. This means that it maintains the heat more evenly at any selected setting.
Aluminum Construction gives light weight with 26 square inches of ironing surface. Saves energy—enables you to iron with less strain on wrist and arm.
Comfortable Easy-Grip Handle is shaped and placed for perfect balance. Heel stand makes it easy to tilt iron back on board without lifting.
Saves Current—because automatic heat control turns current off and on as you iron—takes only the electricity actually needed for ironing at right temperature.
A Product of NOBLITT-SPARKS INDUSTRIES, INC., Columbus, Ind.
Inside and Outside . . . It's Engineered and Built Right . . . A Product of Experience
Heating Element Molded in Base
Automatic Heat Control
Dial the Fabric
Light-Weight Aluminum
Easy-Grip Handle
Tapered Point Beveled Edge
Showing Inside Construction
Outside with Handle Removed
Completely Assembled
It's Your Best Buy FOR REAL SATISFACTION AND YEARS OF SERVICE

Beautifully lithographed in three colors — actual size of this display is 14 by 11 inches.

THIS COUNTER DISPLAY is only one unit in the complete program to help dealers sell the Arvin Automatic Electric Iron.

Other features included are—consumer advertising in leading national magazines; helpful dealer counter sales folders; double-duty sales-price tag attached to iron; and good-will building instruction folder, packed with each iron.

Your Arvin distributor has full information . . . get in touch with him!

ARVIN *is the name on products of experience from* **NOBLITT-SPARKS INDUSTRIES, INC., COLUMBUS, IND.**

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

January
1 9 4 6
©

Hardly any

A few thousand each of Christmas tree lamps and irons were all that the larger Pacific Coast cities received for the biggest holiday buying spree in ages. That is sad history, but carloads of refrigerators and ranges are arriving at jobbers warehouses regularly now.

Strikes

With a CIO electrical workers strike voted for January, the prospect for steady flow of merchandise doesn't look too good at this time. It is aimed at the big three--G-E, Westinghouse and Frigidaire--but may hit others too.

OPA is catching up

In fact, R. C. Cosgrove, president of Radio Manufacturers' Assn., told radio executives that OPA had reduced the promised millions of radios before Christmas to a trickle of samples. Now that OPA is catching up with its work, the strikes may throw production for another big line loss. NEMA estimated 1946 output would be 50% greater than 1940 if----

Fair Trade

Universal's makers, Landers, Frary & Clark, announced it would fair trade all its appliances and housewares in states where Fair Trade laws exist--that's 46 out of 48.

One price

National prices on all appliances have been announced by Westinghouse too. No more "West of the Rockies" or any other zone setup. OPA has approved its price of $179.95 for the 7-ft. refrigerator.

Dollars and cents

Dollar and cents prices on General Electric and Hotpoint space and water heaters were set by OPA. The reflector type heater is set at $8.56, including excise; water heaters start at $56.42 for the 10-gal. unit, and go on up.

Assurances

Packard-Bell has declared itself definitely as to dealer policy. Only franchised dealers will get sets, there will be full discounts, no loss leaders, distribution will flow at such a rate as to prevent overstocking and obviate price sacrifice selling, and model changes will be made without obsoleting models.

Spring Markets

Market weeks--Jan. 28 to Feb. 2 in Los Angeles, and Feb. 4 to 11 in San Francisco--will feature everything that's available in appliances. The Los Angeles Furniture Market will be back in its own pre-war building, 2155 East 7th. San Francisco Merchandise Mart has cleared many government agency offices away to permit return of its exhibitors.

Black Light

Black light materials will again be available. Two former Berkeley boys, J. L. and R. C. Switzer, college magicians, who went East to establish "Conti-glo" materials, are now established on their own as Switzer Bros., at 1220 Huron Rd., Cleveland.

New music

Sherman Clay & Co., with stores in San Francisco, Oakland, San Jose, Fresno, Seattle, Portland, originally a music house, will have a strong appliance department in each store. Sample lines are already on display in them and sales will begin when merchandise arrives.

Big

May Co., Los Angeles big department store, has almost ready for occupancy a $200,000 one-story appliance store adjacent to its Wilshire Boulevard store. It will have a 300-seat auditorium, will contain kitchens, bathrooms, living rooms, bedrooms and laundries installed and using appliances.

New

General Electric Supply is moving into a large new building in Portland, and has broken ground for a new place in Boise.

Growing

Westinghouse Supply, says Charlie Mathews, San Francisco district manager, has a new place in Sacramento and will soon have one in Fresno. The Oakland branch has acquired more ground for expansion and San Francisco's main office is looking for a new site because a freeway project has taken over ground it had its eye on for a new building.

Moves

Kelvinator has consolidated many of its manufacturing operations in Grand Rapids instead of Detroit and expects to turn out 1,100,000 units yearly.

Flash

Biggest news in the lamp industry was Sylvania's purchase of Wabash Appliance Corp., which only recently had bought Birdseye. This puts Sylvania into photoflash lamps as well as all other types, for Wabash press lamps have been big favorites of photographers and fans. Wabash will be operated as a separate subsidiary.

Selling stations

Selling stations are to be offered dealers by Frigidaire, providing a packaged appliance sales section for their stores without remodeling. 1946 models of refrigerators will start at a 4-ft. and run to a 13-ft. cold-wall size. A line of kitchen cabinets and sinks will also be made.

Fixtures

Globe Lighting, national commercial and domestic fixture manufacturer, located in Brooklyn, will start making fixtures in Los Angeles shortly.

Another "Natural" FOR YOUR THERAPEUTIC DEPARTMENT...

PROFESSIONAL STANDARDS IN A USE-AT-HOME PAD

BECAUSE IT WAS DESIGNED ESPECIALLY to meet the exacting demands of sickroom use, the SAMSON Hospital Type Heating Pad belongs by its very nature in your therapeutic department.

But SAMSON has done more than just incorporate professional standards in a heating pad for the home. For by putting this pad in an eye-catching box that illustrates its various applications . . . that depicts the professional use of heating pads with wet-compress medication . . . *that sells as it educates,* SAMSON offers your therapeutic department another self-selling "natural"!

We are steadily overcoming the unpreventable reconversion holdups that have repeatedly tried your patience and ours. Soon, *without sacrifice of quality,* we hope to provide SAMSON appliances in quantities to meet all your demands.

SAMSON UNITED CORPORATION, ROCHESTER 10, N. Y.
Samson United of Canada, Limited, Toronto

SAMSON

CHECK THESE FEATURES!

- Patented SAFE-T Circuit
- 3 Fixed Heats—Low 125°, Medium 150°, High 175°
- 10 Safety Controls
- Permanently Sealed 100% Wetproof Cover of DuPont Fairprene
- 2 Zelan-treated Perspiration and Stain Resistant Washable Extra Covers, with Tie-Tapes
- Cushion-Comfort Padding
- Strain Relief Switch
- "Touch Tells" Indicator for night use
- Approved 12-foot Rubber Cord and Plug
- Underwriters' Listed

Machined from hard drawn aluminum.
98% copper; hard drawn rod with forged spacer.
SERVICE CONNECTORS
Service Entrance Connectors.
Full line aluminum connectors.

All Types and Sizes. Yoke-and-Nut Type from No. 10 to 1,000,000. Also Service Entrance Connectors, Service Post and special connectors, in widest variety.

Penn-Union Service Connectors have accurate machine-cut threads, and carefully chamfered edges—do not catch in lineman's gloves.

Durable—re-usable over and over. Fully approved by the highest authorities in the utility field, for the most exacting service.

Penn-Union also makes a **complete** line of Tee Connectors, Cable Taps; Straight, Parallel, Elbow and Cross Connectors; Bus Supports, Clamps, Spacers; Grounding Clamps, Terminal Lugs, etc.

Leading users have found that "Penn-Union" on a fitting is their best guarantee of Dependability.

Kenneth Anderson Co.
334 East 4th St.
Los Angeles

Northwestern Agencies
2411 First Ave.
Seattle, Washington

F. M. Nicholas Co.
1123 Harrison St.
San Francisco

PENN-UNION ELECTRIC CORPORATION, ERIE, PA.

The *Complete* line of Conductor Fittings

PENN-UNION

Ready for a BIG 1946!

The Full G-E Home Laundry Line!

Feature complete equipment for a sparkling new G-E All-Electric Laundry—and watch your sales "go places!"

SOON YOU'LL HAVE THEM ALL . . .

G-E Washers, Dryers, Ironers. One *complete* home laundry line to talk about—and SELL!

Your market is *waiting* for you . . . millions of women who want to buy Washday equipment. What's more, (according to a recent national survey) *53% of them prefer G-E appliances!*

We're telling your market!

We're not letting these women forget about G-E. Every month in leading magazines—every week on the air with "The G-E House Party"—we're shouting about the All-Electric Laundry wonders G-E has to offer!

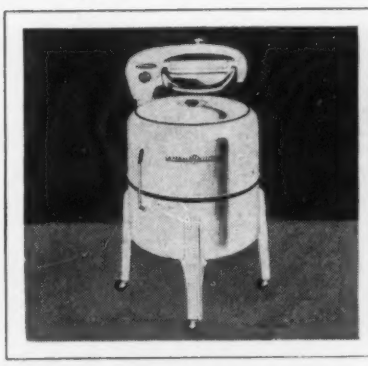
So let prospects know you have the *complete* line. See your distributor for your G-E Home Laundry Self-Starter Promotion Package . . . and let's go! General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

***TELL YOUR CUSTOMERS** to listen to Art Linkletter, in "The G-E House Party," every afternoon, Monday through Friday, 4 p. m., E.S.T., CBS.*

All-Electric Laundry

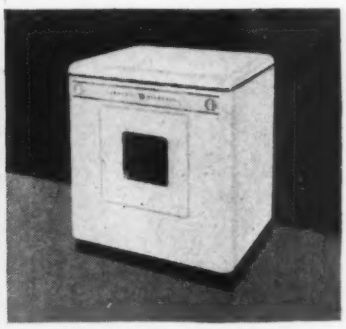
"THE APPLIANCES MOST WOMEN WANT MOST"

GENERAL ELECTRIC

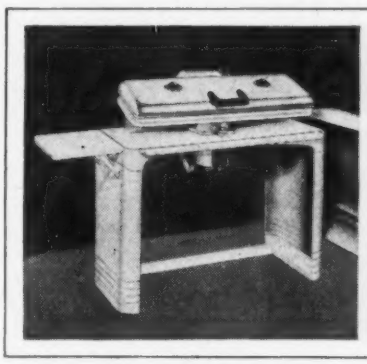


New, Improved G-E Washer!—for "Quicker-Cleaner" Washing! G-E quality through and through! And *only* G-E has *all* these features:

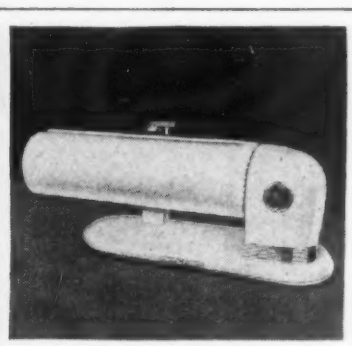
"Activator Action"—gentle, thorough. *One-Control Wringer*—tops for safety and flexibility. *"Permadrive Mechanism"*—only 4 moving parts. Needs no oiling.



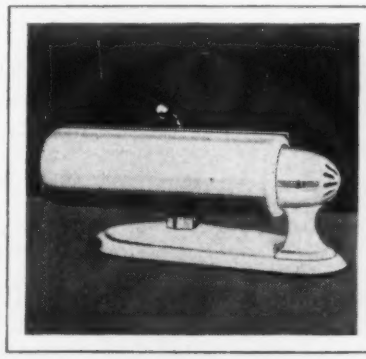
G-E Automatic Tumbler Dryer — dries clothes indoors! It's new—and women want this G-E wonder that lets them dry clothes *indoors*, rain or shine. Does away with lugging heavy baskets . . . gently "tumbles" clothes dry, and does it in a hurry. Saves hours of time. Saves back-breaking work.



G-E Automatic Flatplate Ironer — cuts ironing time way down! With the G-E Ironer, a woman can *sit down and iron* . . . quickly, easily turn out flat pieces, shirts, dresses. Automatically controlled heats.



G-E Automatic Portable Rotary Ironer— Light for lifting, but does a heavy job of work. Turns out all types of ironing quickly, beautifully. A touch of the hand puts the ironer in operation.



G-E Portable Rotary Ironer— An inexpensive leader! Weighs only 33 pounds, but does a full, efficient job — every time. Manually operated.

New G-E Automatic Washer is coming soon! It's revolutionary! The last word in automatic washers! Washes, rinses, damp-dries, cuts itself off—*automatically*.

Chromy Says:

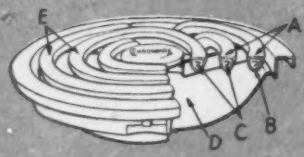
"Faster Cooking... Better Looking!"

CHROMALOX

Triangular Electric Range Units

Make Satisfied Customers

CHROMALOX DESIGN FOR MAXIMUM PERFORMANCE



A. Exclusive "triangular" design assures maximum flat contact cooking surface.
B. Made with INCONEL which is rust-proof, acid-proof, corrosion-proof.
C. Highest grade nickel-chromium heating elements.
D. Aluminumized steel reflector reflects maximum radiant heat . . . does not rust or distort . . . lifts out and is easily cleaned.
E. Heating coils are independently replaceable without special tools.

Trim, glistening, modern . . . CHROMALOX Triangular Range Units make housewives satisfied customers. More cooking contact surface—plus maximum radiant heat—provide new high-speeds in cooking.

CHROMALOX Triangulars install without muss, fuss or bother with a screwdriver as your only tool. And two stock sizes fit *all* electric ranges when you use low-cost CHROMALOX stainless-steel Adaptor Rings.

Here is your opportunity to capture range unit replacement sales. Write for folders CF-145 and L-1023 which give replacement data on all ranges.

EDWIN L. WIEGAND CO., 7540 Thomas Boulevard, Pittsburgh 8, Pa.

Montgomery Bros., 420 S. San Pedro St., Los Angeles, Calif.; 2333 N.W. Westover St., Portland 10, Oregon; 61 Fremont St., San Francisco 5, Calif.; 911 Western Ave., Seattle 4, Wash.
The Paterson Co., 1921 Blake St., Denver 2, Colorado

RC-11

On new ranges and for replacement

CHROMALOX means "Electric Cooking at its Best!"

Water Heater (108)

For farms or other installations having electric service but lacking plumbing, Rheem Mfg. Co. has developed a 17-gal. portable electric water heater which may be filled by hand. While this unit requires no water supply line, it can be hooked to a water pipe and made automatic, the announcement states. This unit is designed to operate on house current. In operation, the heating process forces hot water to a supply faucet on the side of the tank. The tank is tested for a working pressure of 150 lb. per square inch, and a thermostat control is provided to maintain desired uniform temperature, it is stated.

Range (109)

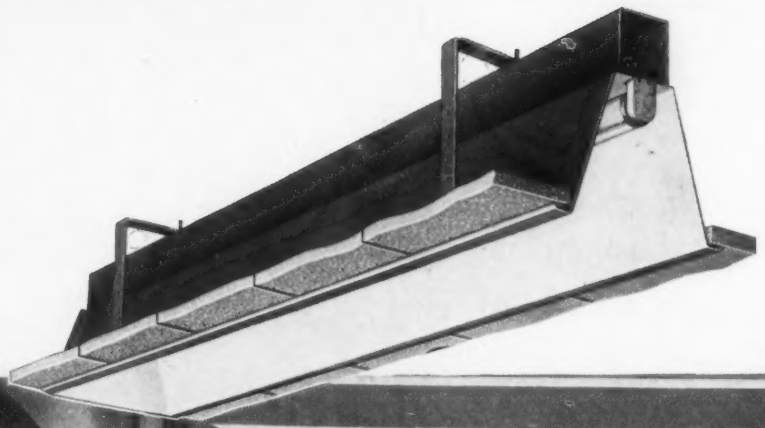
Pressed Steel Car Co.'s Presteline electric range will have a selection of three top burner arrangements, each with three burners and a deep well cooker, according to announcement of the company. Cooking top measures 22½ x 40 in.; oven is 17 x 17 x 20 in. The broiler is at the top of the oven for accessibility, and barbecue pan is of aluminum, with three-position adjustable broiling racks. Oven, deep well cooker and appliance outlet are fully automatic, according to the announcement. Storage compartment is 16¾ x 20¾ x 21¾ in., with adjustable shelves and door racks for hanging kitchen tools. A second storage compartment provides for dishes, pot lids, covers.

Portable Heater (110)

A portable radiant heater, called the Infralectric, has been announced by the Radiant Heater Corp. This unit, which heats by invisible radiant rays, consists of two glass plates fitted into an upright stand. According to the manufacturer, it will not scorch or burn objects placed against it during operation and wet bodies brushing against it will not receive shock. It can be connected to any voltage, a-c or d-c, and to any circuit of 15 amp. or above. Electric consumption is said to be about 1,000 watts per hour. It is made in both wall and portable models.

Switch Plate (111)

A luminous plastic switch plate shield has been developed by Originators Inc. According to the manufacturer, this shield will fit over any standard toggle or push-button plate and when exposed to any normal light during the day will glow all night.



for
MODERN
EFFICIENT
BUILT-IN
LIGHTING

CURTIS RECESSED TROFFERS

Curtis one lamp fluorescent Troffers are excellent for office lighting and a variety of other interiors. They are particularly suited to low or suspended ceilings.

• Scientifically designed by Curtis engineers to eliminate high brightness, the sloping reflector sides of these units, together with Curtis Fluracite finish brings exceptionally high lighting efficiency. This has made the use of diffusing glass panels unnecessary, resulting in exceptionally low maintenance cost and higher average light output.

The appearance of these troffer units when installed is very pleasing and the ceiling effect is smooth and interesting. Shielding is 45° crosswise and a one-piece louver (optional) provides 30° longitudinal shielding. These louvers are easily removed for maintenance.

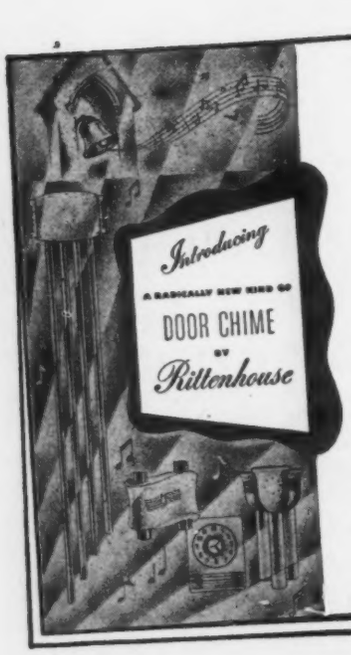
AVAILABLE IN 40 and 100 WATT SIZES

Each 40 watt troffer section is exactly 48″ long and fits into a 12″ opening. 100 watt troffers are 60″ long and fit a 12″ opening. 12″ is required for recessing labels.

For full details and specifications, send for data on Curtis Recessed Lighting.

CURTIS
Lighting
INC.
6135 WEST 65th STREET
CHICAGO 38 • ILLINOIS

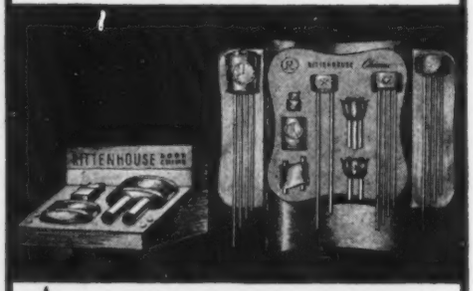
W. K. TURNER, Terminal Sales Bldg., Seattle 1, Wash.



Write FOR YOUR COPY OF THIS VALUABLE CHIMES MERCHANDISING BROADSIDE today!

NATIONAL MAGAZINES
. . . to tell the Rittenhouse Chime story to millions of America's consumers—wherever they live.

SUNDAY NEWSPAPERS
. . . advertisements in leading key-city Sunday Magazines—for immediate sales volume.



EXPERTLY DESIGNED DISPLAYS
. . . for sales-floor, window and counter use. Colorful, compelling and prospect-stoppers.

Here's the ALL STAR

RITTENHOUSE CHIME MERCHANDISING STORY . . .

RITTENHOUSE—top name in the electric door chime industry—has stepped on the starter! Production of those models which will have the widest and most immediate ready sale because of their design and price appeal is going ahead at full speed. Other models will be made available just as rapidly as maximum production effort permits.

Never before have electric door chime sales prospects reflected such glowing profit opportunities for electrical appliance wholesalers and dealers—*in every community.* And, timed perfectly to your sales efforts, millions are already seeing the strong, consumer-attracting Rittenhouse advertisements in leading National Magazines—and in big-circulation, key-city Sunday Newspaper Magazines.

In words and pictures, the Rittenhouse Broadside tells the story of a skillfully planned, up-to-the-minute merchandising program to make Rittenhouse Chimes the fastest selling, most profitable and appealing line of electric door chimes ever presented.

Expertly engineered to afford new mechanical features that make possible undreamed-of tone richness and backed by the hardest hitting sales and advertising set-up in the history of chime merchandising, Rittenhouse gives you everything that makes for record sales and profits.

Send for this Rittenhouse Broadside now. Note the striking beauty of the ten new 1946 models styled by America's famous designer-stylist Norman Bel Geddes. Go over the important consumer-appealing Rittenhouse mechanical features. Weigh the sales power of the tremendous circulation, prestige-creating publications Rittenhouse is using to help you sell.

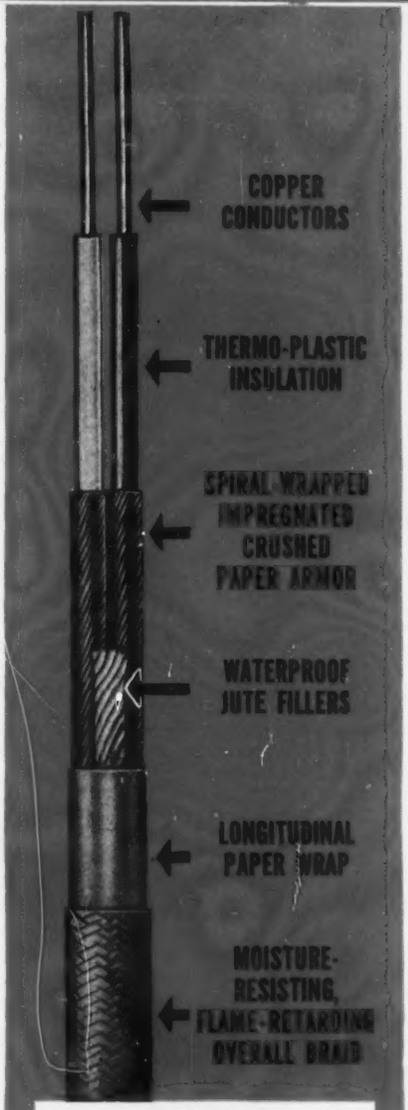
Join the Rittenhouse "Parade of Stars." Write us—TODAY.

Watch for Rittenhouse advertising in America's leading consumer magazines!

Rittenhouse *America's Finest Chime Signals*

THE A. E. RITTENHOUSE COMPANY, INC., HONEOYE FALLS, NEW YORK

A NEW CABLE FOR HOMES AND FARMS



COMPARISON CABLE DIMENSIONS

No. 14/2 PVX Non-metallic Sheathed Cable

Type T Conductor—.131 inches
Overall Dimensions—.23 x .44 inches
Weight per M Feet—77 lb.

No. 14/2 Standard Non-metallic Sheathed Cable

Braided rubber-covered conductor—.200 inches
Overall Dimensions—.37 x .63 inches
Weight per M Feet—104 lb.

PVX

REGISTERED TRADE MARK

NON-METALLIC SHEATHED CABLE

with Thermo-plastic Insulated Conductors

ADVANTAGES

1 Small overall diameter—easy to handle. Requires smaller holes

2 Lighter weight—Facilitates handling during installation

3 Type T conductors—Insulated with long-life, thermo-plastic compound

4 Small diameter of conductors—Requires less space in outlet boxes

5 Positive conductor identification—Insulation has permanent color

6 Conductor insulation—Resistant to oils, acids and alkalies

7 Insulation and braid—Both are flame- and moisture-resistant

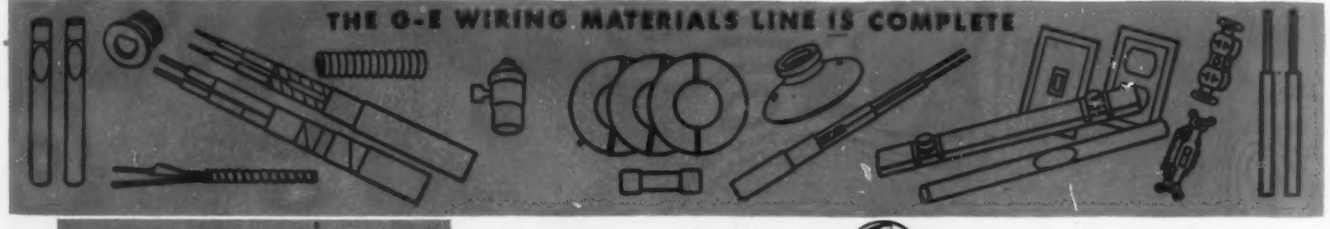
8 Improved braid finish—Smooth, non-tacking and non-marking

9 Free-stripping—Braid, paper armor and insulation all free-stripping

10 High rating—Approved for 60 degree C operation

Use this new Underwriters' approved cable for wiring homes, farm buildings and other small buildings. You'll find PVX easy to install. It has small diameter and is light weight. It can be depended upon to give long service. PVX has Type T conductors insulated with thermo-plastic compound. This insulation is resistant to oils, acids and alkalies. Improved crushed paper armor protects the conductors and overall is a flame- and moisture-resistant braid. PVX is available in sizes 14 to 4 without ground wire.

FOR FURTHER INFORMATION see the nearest G-E Merchandise Distributor or write to Section W169-18, Appliance and Merchandise Dept., Bridgeport, Conn.



GENERAL ELECTRIC

THE ARMY AIR FORCES SAID

"Well done!"

MRS. HOUSEWIFE WILL ALSO SAY

"Well done!"

WHEN YOU INSTALL

TK REPLACEMENT UNITS

ARMY AIR FORCES
AIR TECHNICAL SERVICE COMMAND
HEADQUARTERS, MIDCENTRAL DISTRICT
211 EAST NORTH WATER STREET
CHICAGO 11, ILLINOIS

June 8, 1945

Tuttle & Kift, Inc.
1823 N. Monitor Ave.
Chicago 39, Illinois

Gentlemen:

The Air Technical Service Command requi... contractors engaged in producing aeronautical equipment and mate... for the Army Air Forces be rated according to the efficiency of their... The purpose of this ... is to provide ... for improving the efficiency of their inspection ... recognition for those who maintain their ... high standard of ...

To encourage ... Quality Control ratings when the AAF and ... materials, the ATSC ... furnishing a ... Quality Control equipment ... tablished a ... "Approved" and "Deferred". The "Approved" rating denotes that the contractor has an inspection system in operation which meets the high standard of Quality in accordance with AAF policies. The "Deferred" rating notes that the contractor does not have an inspection system in operation which meets with the approval of the AAF.

Therefore, under this system, your facility has been granted an "Approved" rating in manifestation of your outstanding record for Quality inspection procedures and control.

In recognition of your outstanding performance, it is brought to your attention that it is permissible to publicize the distinction of receiving this highly coveted inspection award.

It has been noted that facilities receiving this award have adver... tised ... various trade journals and other media. Therefore, as ... this office is enclosing a reprint of a full page ad w... was published in ... national trade magazine.

Yours very truly,

HOWARD R. HUTCHISON
Major, Air Corps
District Public Relations

... Supervisor

cc:

it is with the utmost pride that we acknowledge receipt of the Army Air Forces' letter of high praise for our efforts. The same precision workmanship that won plaudits from Uncle Sam will help build your business because you make a loyal friend every time you replace burned out electric range units with fine quality laboratory tested T K replacement units. Better get on the T K bandwagon now.

Get a T K Dealership Now. MAIL THIS COUPON

TUTTLE & KIFT INC.

1825 North Monitor Avenue · Chicago 39, Illinois

Gentlemen: please send me name and address of nearest T K distributor. No obligation.

FIRM NAME _____

ADDRESS _____ CITY _____

Radio Line (112)

G-E's table model radio-phonograph is a five-tube set, with standard broadcast band and 6½-in. Dynapower speaker. A sapphire needle is said to be good for years of normal use. Case is American walnut and maple; size 18¼ in. wide, 9 3/16 in. high, 3 1/16 in. deep. Other G-E models include a console combination with a-c superheterodyne circuit, standard and short-wave bands, 12-in. speaker, automatic record changer; a portable set, which can be plugged into house current, a-c or d-c, or played on battery; several portable models, some of them for standard broadcast, some for standard and short wave.

Street Lamp (113)

A 2,500-lumen street series lamp of smaller diameter and shorter length has been announced by G-E. The new lamp is 3⅛ in. in diameter and 6 15/16 in. long, as compared with 4⅜-in. diameter and 8¼-in. length of the older unit. It is claimed that the new lamp will encourage use of 2,500-lumen lamps in replacement of 1,000 lumen and smaller, since replacement will involve no change in luminaire, and will assist in standardization of street lighting luminaires. Technical data: lumens, 2,500; amperes, 6.6; base, mogul screw; bulb, PS-25 clear; filament, C-2V; M.O.L., 7⅛ in.; L.C.L., 5⅜ in.; burning position, base up; life, 2,000 hours.

Voltage Regulators (114)

Sylvania has developed three minature cold cathode voltage regulators for 65- to 90-volt operation, where currents range between 2 and 3 ma. and maximum voltage variation may not exceed 3 volts. Bulbs are enclosed in a metal shield which is color coded for quick visual identification. Used in series with a current-limiting resistor of approximately 15,000 ohms on the load side of a 175-volt d-c source, these units may be operated in any position. Two or more tubes of the same type may be operated in series for better voltage regulation, the announcement states.

F-Lamp (115)

Duro Test Corp. is manufacturing a fluorescent lamp, called Safreen, which it claims will provide a brighter and more mellow light, instant illumination and longer lamp life. The manufacturer states that the 40-watt lamp will produce 20% more light than the standard F white and 40% more than the standard F daylight. Rated life is stated as 5,000 hours.

Luminaire (116)

Pittsburgh Reflector Co. has announced a new luminaire, the Wilson, in its Presidential series. It has a hinged egg crate louver, hinged for easy maintenance. It has four 40-watt T-12 fluorescent lamps operating on 110-125 volts, 60 cycle, a-c; is available for 50 cycles. Over-all length is 48⅛ in.; height 7¾ in.; width 15⅞ in.

You Can Become A Charter Member of the Best Informed Audience in the World . . .

A FACT!! An exciting new world is in the making — out of the developments of science — before our very eyes. **A DEMAND!!** Every thinking American wants to know HOW these amazing achievements will shape the pattern of his present and future life. **A PROMISE!!** Starting in April, 1946, McGraw-Hill will publish a thrilling new non-technical general magazine that will interpret, month by month, the impact of the scientists' world-shaping *as it happens.*

MEET A NEW AND DIFFERENT MAGAZINE

The job that SCIENCE ILLUSTRATED has set for itself has never been done before.

The need for such a magazine has long existed but the *demand* was never as pressing . . . the American public was never as inquisitive minded . . . as science-hungry . . . as deeply conscious of impending changes in our social and economic life as it is today.

SCIENCE ILLUSTRATED will cover the broad fields of science, invention, mechanics and discovery. It will discuss the new challenges and opportunities that are coming out of radar, the heady secret of the atom, and the amazing, world shaking advancements in communication and transportation.

It will interpret, for the progressive thinking layman as well as for the business man, the great new triumphs in drugs, medicines, chemicals, metallurgy, textiles, fabrics, food processes, materials, methods, procedures — the entire range of scientific achievement — in terms of their contribution to better living.

SCIENCE ILLUSTRATED will *report, interpret,* and *project!* It will be fast and fascinating reading — a thrilling new magazine for an exciting new world! In its pages, month after month, the products, developments, and horizons of scientific achievement will come alive in terse, sparkling text and dramatic colorful pictures.

The subjects discussed in SCIENCE ILLUSTRATED will be of vital importance to everyone in every walk of life. No matter where your interests lie — in the products and processes of business or in the things which make for better and more efficient living — you will read this new magazine with profit, and with interest.

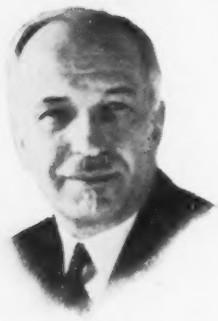
If you would like to keep abreast of the world of tomorrow make your reservation NOW for the first twelve issues of

Science ILLUSTRATED

A McGraw-Hill Publication

Experience Plus "Know-How" Will Produce

Science
ILLUSTRATED
A McGraw-Hill Publication



DR. GERALD WENDT

Editorial Director: Editor, scientist, author, lecturer—most recently, full time science consultant for Time-Life . . . New York World's Fair Director of Science and Education . . . a practical, working scientist.

HARLEY W. MAGEE

Editor: Newspaper reporter, staff writer and, at one time, city editor for Associated Press in Chicago . . . formerly managing editor of Popular Mechanics . . . a writer with long experience in interpreting science for the lay reader.

DEXTER MASTERS

Editorial Consultant: Editor of Army Air Forces magazine, "Radar" . . . formerly staff member Radiatron Laboratory Massachusetts Institute of Technology . . . formerly member of Fortune's Editorial Staff . . . first editor of Tide.

To bring you this month by month reporting of progress and achievement McGraw-Hill has assembled the finest talent available. Working hand in hand with the men pictured here is a top-flight staff of science writers, artists and photographers . . . men with long experience in making science *understandable* and *interesting*.

In addition, the editors of SCIENCE ILLUSTRATED will have at their command the great technical, consulting, research, and world-wide news gathering facilities of the McGraw-Hill Publishing Company. 196 editors, writers and technical experts, which staff the McGraw-Hill publications, will serve as consultants. All of McGraw-Hill's publishing experiences and financial resources are behind this thrilling new magazine.

N.B. to Advertisers: *What kind of an audience will be available to you in SCIENCE ILLUSTRATED? Obviously, an alert, intelligent, forward thinking group of people . . . the sort of people that are a step ahead of the parade in interests, desires and purchasing power. The initial print order will be 500,000 copies. Forms close on February 10th for the April issue. Write to SCIENCE ILLUSTRATED or telephone your nearest McGraw-Hill office for complete information.*

FIRST ISSUE ON THE NEWS-STANDS APRIL, 1946

Price per copy 25 cents. Annual Subscription . . . $3.00 Per Year

Science Illustrated
330 West 42nd Street
New York 18, New York

Yes—I want to become a charter member of the best informed audience in the world. Enclosed is my check (or money order) for $3.00. Please send me the first 12 issues of SCIENCE ILLUSTRATED—starting in April, 1946.

Name .....

Street and number .....

City and State .....

Use this Coupon

FOR SAFETY'S SAKE . . . USE CONDUIT (*Full Weight Rigid Steel*)

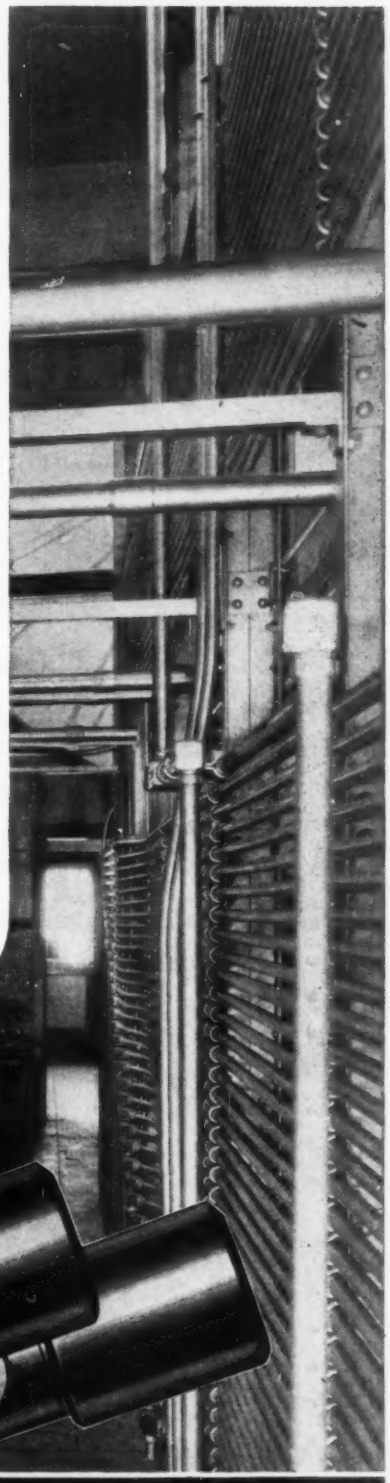
Write "*Adequate Protection*" into Today's Wiring Plans

THE contractor who installed this wiring system has given the owner and occupants of the building the maximum in protection. He has fully met the high standards of the National Electrical Code by installing standard-threaded full-weight rigid steel conduit—Youngstown's Buckeye Conduit.

Full-weight rigid steel conduit is the only recognized adequate protection against short circuits from moisture, vapor, dust, dirt, or explosion, in hazardous locations and occupancies. It is the best protection against vibration and crushing. It discourages tampering by unauthorized or well-meaning amateurs.

In the wiring systems you are now planning for new plants or for plant modernization, you can guarantee adequate protection in this same way, by specifying Youngstown's full-weight rigid steel conduit—Buckeye Conduit.

Buckeye has been furnishing uniform, all-around protection for electrical wiring for more than a third of a century. Preferred by leading contractors, it is available through distributors from coast to coast.



Ask your distributor for:
Youngstown Buckeye Conduit-Pipe and Tubular Products - Sheets - Plates - Electrolytic Tin Plate-Coke Tin Plate-Bars-Rods-Wire-Nails-Tie Plates and Spikes.

YOUNGSTOWN
THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN, OHIO
Manufacturers of
CARBON - ALLOY AND YOLOY STEELS

Good Fluorescent Lighting Needs Good ENGINEERING

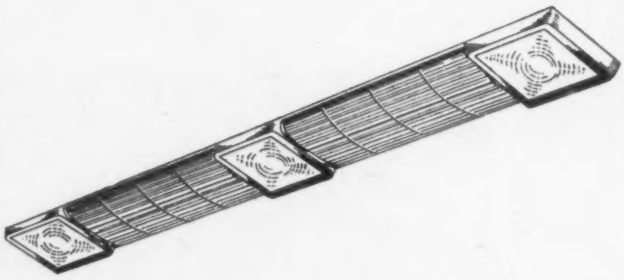
Holoflux Controlescent* Luminaires ARE Engineered

*Controlled Fluorescent

Holoflux Controlescent Luminaires are the result of constant Holophane Research to produce recessed fluorescent lighting without the mechanical and optical flaws of prewar types. These Luminaires put the light down on the working area, redirecting high angle useless light (glare) into useful zones. Some light is directed upward for comfortable ceiling illumination. Scientific Control of Light retains high fluorescent efficiency—assures complete comfort.

Holoflux is Engineered OPTICALLY

- Holophane Controlens controls light
- Controlens shields bare lamps
- Intensive light distribution
- Pleasing upward ceiling light
- Accommodates 2 or 3 40 watt lamps
- Lamps and ballast easily serviced
- Smooth, modern lines



This Holoflux unit has been specially designed for store lighting, providing an ideal combination of Fluorescent and Incandescent illumination. The incandescent unit in the center is fixed but beams of units at each end can be adjusted to achieve the best angle for model lighting.

Holoflux is Engineered MECHANICALLY

- Single unit installation or continuous run
- Neat ceiling frames and end plates
- Shallow (6⅜") recess depth
- Levelling device for irregular ceilings
- Multiple hanging methods
- Simple ganging arrangement

Consult Holophane Engineering Service without obligation.
Write for Data Sheets on Holoflux Luminaires today.

ARMY E NAVY
Holophane Trade Mark

HOLOPHANE COMPANY, INC.... *Lighting Authorities Since 1898*

342 MADISON AVENUE, NEW YORK 17 • Holophane Co., Ltd., 385 Yonge St., Toronto, Can.

Pacific Coast Representatives:—R. C. Dummel, San Francisco; F. van Gilluwe, Los Angeles
Distributors, General Electric Supply Corp.

Give him a strand he can reason with, handle easily. One he can shape without popping a rib out of place.

That'll be Bethlehem strand. There's nothing cranky about it; nothing balky or stubborn. Naturally, the stronger Bethlehem grades are stiffer than those of lower strength; but in every case, there's a flexible, ductile quality that makes for better handling.

Another good Bethlehem feature is the uniformity of the product. Any reel of Bethlehem strand, selected at random, will show the same careful workmanship as the one you used last week . . . or the one you'll use tomorrow.

Ask for Bethlehem strand in any standard grade. It comes with a bethanized zinc coating of A, B, or C weight—you can select whichever is best for corrosive conditions in your area.

BETHLEHEM PACIFIC
COAST STEEL CORPORATION

General Offices: San Francisco

District Offices: Seattle, Portland, Los Angeles, Salt Lake City
Fabricating Works: South San Francisco, Alameda, Los Angeles
Steel Plants: Seattle, South San Francisco, Los Angeles
Mill Depots: Seattle, Portland, San Francisco, Los Angeles

Cole Electric Co.

1510 South Los Angeles Street
PRospect 2068
LOS ANGELES 15, CALIFORNIA

•

POWER PLANT EQUIPMENT

AIR BREAK SWITCHES
MANUALLY OPERATED

AIR BREAK SWITCHES
MOTOR OPERATED

DISCONNECTING SWITCHES

BUS AND CABLE FITTINGS

BUS AND CABLE SUPPORTS

FUSE MOUNTINGS

FUSES

SWITCHBOARDS

INDUCTION RELAYS

MARINE EQUIPMENT

SWITCHBOARDS

ELECTRICAL EQUIPMENT RELAYS

AIRPLANE EQUIPMENT

BOMB RACKS

SWITCH HOUSINGS

THROTTLE SWITCHES

LIMIT SWITCHES

OIL FILLED SWITCH HOUSINGS

SWITCHBOARDS

RELAYS

•

Pacific Coast Representatives

EICHER & BRATT
Colman Bldg., Seattle 4, Washington • • Eliot 2722

EARL S. CONDON COMPANY
357 S. Hill St., Los Angeles 13, Calif. • • MI. 2831

Relay (117)

Westinghouse has a new type AYJ magnetic overload and jamming relay for d-c operation. The single-break normally closed main contacts and the double-break auxiliary contacts are suitable for carrying 5 amp. continuously and for interrupting a d-c inductive coil load of 150 va. maximum, the manufacturer states. Type AYJ relays are operated by a series of copper strap wound type of coil. Coils and coil studs are available for currents ranging from approximately 75 to 625 amp. The coils and auxiliary contact parts are insulated from the relay frames for 600 volts.

Silicone Greases (118)

Dow Corning Corp. has put on the market two new silicone greases, DC 33 and 44, and has improved its DC 31 and 41, introduced last year. According to the company announcement, the two new greases are serviceable in ball bearings operating at speeds up to 10,000 r.p.m. and are subject to bleeding of less than 2% after 16 hours at 230°F. D.C. 33 is said to be effective over a temperature range of —94°F. to 300°F.; DC 44 at temperatures ranging from —4°F. to 345°F.

Commercial Fixture (119)

Mitchell Mfg. Co. has announced new louvered two- and four-light commercial luminaries, featuring full-depth metal louvers and double-strength ceramic treated glass side panels. Unit has standard tulamp ballast. sockets and starters; power factor over 90%; stroboscopic corrected; 110-125 volts, 60 cycles a-c, with higher voltages available.

Reversing Contactor (120)

Struthers-Dunn Inc. has a new heavy-duty, light weight, type 135CXX reversing contactor, designed for use with polyphase motors up to 1 hp., single-phase motors to ¾ hp., and available from 110 volts to 600 volts a-c. This unit is 4¾ in. wide, 4 in. high and 1⅞ in. deep and weighs approximately 2½ lb. It consists of two three-pole contactors mechanically interlocked.

New Lamp Construction (121)

A new construction which locks bulb to base is now standard on Wabash-Birdseye lamps, from 300 watts upward, reflector and industrial infrared lamps, Wabash Appliance Corp. has announced. Consisting of a threaded collar screwed into and notch-locked to the base, the new construction eliminates base cementing and neck strapping, the manufacturer states.

Photolamps (122)

Wabash Photolamp Corp. has announced changes in its line. Blackout, diffusing flash and other strictly wartime lamps have been removed, and midgets are stressed, with the new oxygen-filled speed flash and the No. 25B Blue Midget for color, which have been produced for the government since 1941.

Arc Welding Compound (123)

An arc welding compound introduced by General Electric is said to aid in instantaneously creating and maintaining a metallic welding arc, where low currents and small diameter electrodes are used.

CHANCE
Tips Grounding Sets for Every Overhead and Substation Requirement

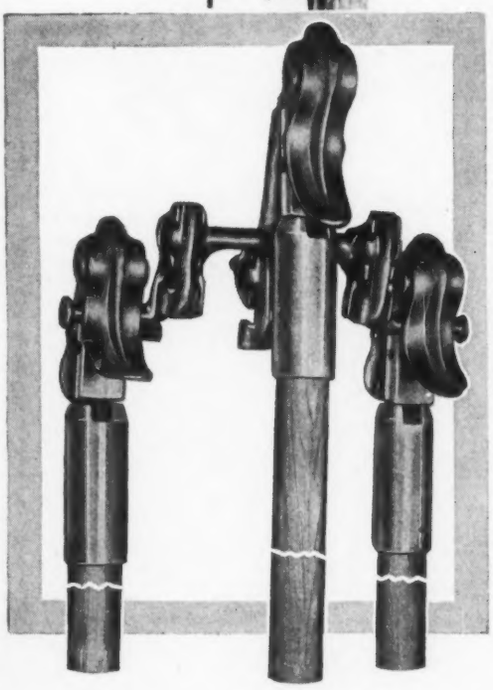
Dependable Protection on all types of jobs—For Single-phase Lines up to Heavy Substation Bus Bars

For ample protection to linemen making repairs on "cold" lines, Grounding Equipment should make tight contacts at all points—maintain high conductivity and provide insulation protection during application. You get all this in every type and size and a few plus features, when you specify Tips Grounding Equipment.

Single clamps or combination sets are available for all types of high-line or substation work with mechanical and electrical characteristics to meet every requirement. Clamps or clusters of clamps may be obtained, either mounted on poles or unmounted, for application with clamp sticks. This equipment is designed by experts and thoroughly tested to provide the protection that your linemen should have against unexpected current surges.

The clamps snap on with minimum arcing and screw up tight on the conductor by turning the poles or eye screws. Jumper pressure contacts are pre-tightened with a wrench. There are no loose contacts as when hazardous grounding chain is used. All parts are carefully tested to meet high Safety Standards. All poles are laminated for strength and tested to resist 75,000 volts per foot.

Complete details on Chance-made Tips Grounding Equipment will be found in the grounding section of your Tips Tool Catalog No. 8.



Substation Bus Bar Clamps and combination sets are made in varied types and sizes for flat or round bus bars. The eye screw clamps at right have removable bronze inserts that make them adjustable to fit a number of different sized bus bars. These, too, are available either mounted or unmounted.

"THERE'S NOTHING TOO GOOD WHERE LIFE IS AT STAKE"

abc INDUSTRIES

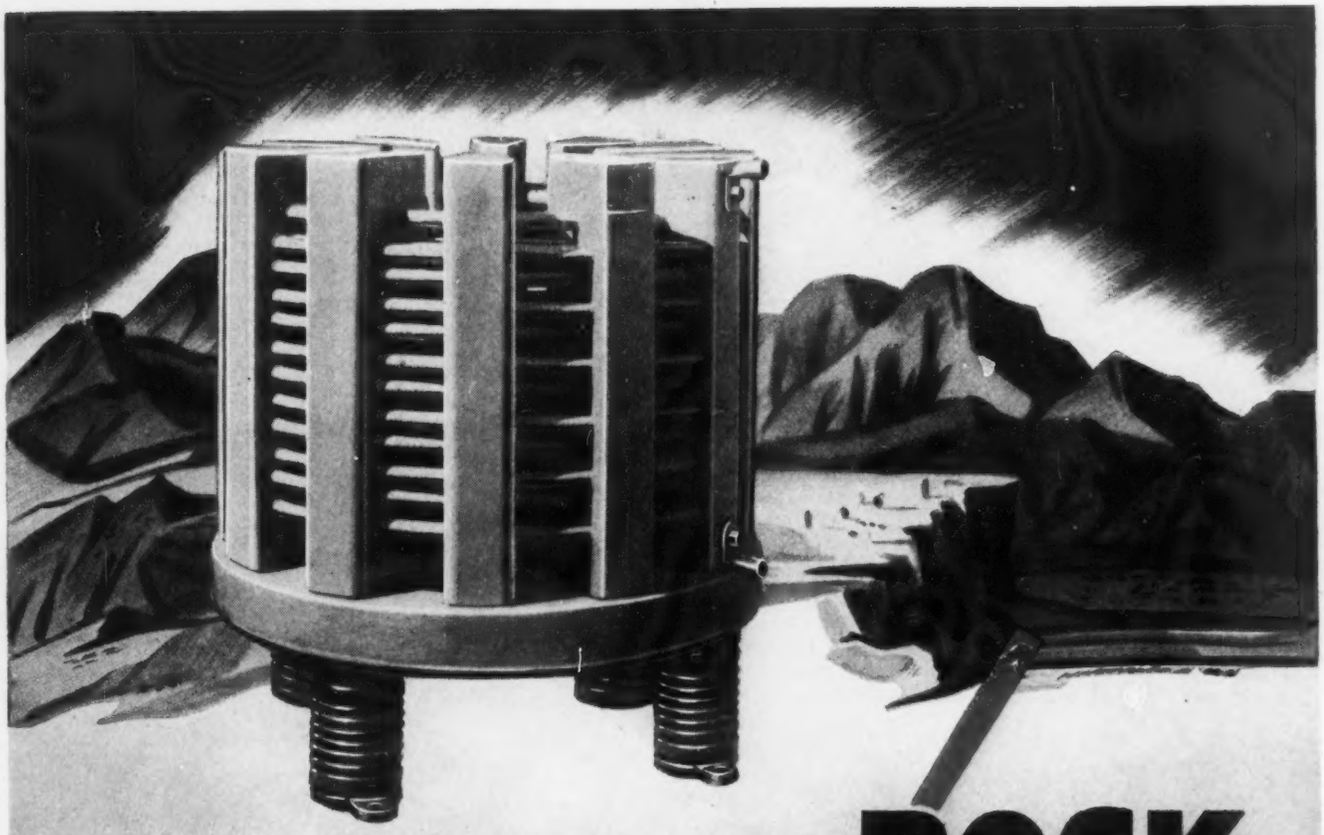
A·B·CHANCE CO·

CENTRALIA · MISSOURI

The shades shown here are just a few of the many Railley shades available in assorted designs and colors.

WHAT a new hat is to a woman . . . a new Railley shade is to a lamp. And don't think she doesn't appreciate what a new lamp shade can do to lift the spirit of a tired, worn room. The distinctive new Railley shades will bring you a lot of extra volume to supplement your regular lamp business . . . handsome parchment shades, tastefully decorated, with a quality look that belies their popular prices.

Railley
CORPORATION · CLEVELAND, OHIO
ORIGINATORS OF THE
PIN-IT-UP LAMP



Solid as a ROCK

. . . AND JUST AS WEATHER RESISTANT!

An installation of 120-kva cast-in-concrete reactors made in 1925, each giving a 3 per-cent reactive drop in a 22,000-volt 3-phase circuit.

Cast-in-concrete reactors in metal enclosure, where the degree of reliability required warrants shielding from external causes of failure.

CAST-IN-CONCRETE CURRENT-LIMITING REACTORS

Service records of thousands of G-E reactors prove that CAST-IN-CONCRETE CONSTRUCTION is hard to beat for mechanical and electrical strength, non-inflammability, resistance to weathering.

1. STRENGTH—Conductor and concrete become a one-piece structure, having strength and rigidity to withstand short-circuit magnetic forces.

2. HIGH FLASHOVER VOLTAGE—Good clearances, elimination of through bolts, use of asbestos conductor covering, and large porcelain insulators give maximum assurance against flashover between turns and layers, and against flashover of complete unit to ground.

3. LONG SERVICE LIFE—Materials used in these reactors are selected by G.E. especially for weatherproof qualities. All are fireproof and practically imperishable, making possible a co-ordinated design having both an excellence of performance and extraordinarily long life. Special treatment during finishing process renders them highly moisture resistant.

4. FOR DIVERSE REQUIREMENTS—G-E cast-in-concrete reactors may be obtained in either single- or three-phase designs, and in a number of arrangements to meet installation requirements for indoor and outdoor service. They can also be obtained with metal-clad construction (steel cabinet) to match switchgear equipment.

For details, ask your local G-E representative or write for Bulletin GEA-976B. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

401-26-5155

Again
PREPARED TO SERVE YOUR EVERY
ELECTRICAL WIRE AND CABLE
NEED...
GENERAL CABLE
GENERAL CABLE
ROLL THIS WAY

WHICH OF THESE PRODUCTS DO YOU USE?

Cut Out and File for Future Reference

ASBESTOS WIRES AND CABLES

BARE AND TINNED COPPER WIRE
Solid and Stranded, Copper Covered Steel Wire, Trolley Wires, Segments and shapes.

BUILDING WIRES
Rubber, Braid and Lead, and Synthetics, all types.

CONTROL CABLES
Rubber, Braid, Lead, Steel, Armored and Non-metallic Railway Signal Cable, Fire Alarm Cable, Switchboard Cable.

CORD SETS

FIXTURE WIRE

FLEXIBLE CORDS
All Types.

HEAVY DUTY PORTABLE POWER & CONTROL CABLES
Welding Cables, Mining Machine Cables, Dredge Cable.

MAGNET WIRE
Round, Square and Rectangular, Enameled, Paper, Cotton, Silk, Glass, Asbestos Covered, and Combinations.

NON-METALLIC SHEATHED (ROMEX)

PAPER POWER CABLES
Belted or Shielded, Gas Filled Cables, Oil Filled Cables.

RADIO WIRES AND MICROPHONE & HIGH FREQUENCY CABLES

RUBBER POWER CABLES
Braid, Lead, Steel Armored, and Non-metallic.

SERVICE ENTRANCE, SERVICE DROP CABLE

TELEPHONE WIRES AND CABLES
Rubber Insulated, Paper Insulated.

VARNISHED CAMBRIC WIRES AND CABLES

WEATHERPROOF WIRE
Slow Burning.

X-RAY CABLE

and . . . Electrical Wires & Cables to your specifications

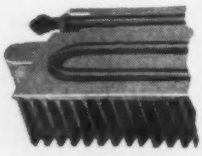
See your phone book for complete address of our sales office in the cities listed below.

GENERAL CABLE
CORPORATION

Headquarters at 420 Lexington Ave., New York 17, N.Y. General Cable Corporation Sales Offices are located at: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Kansas City, Los Angeles, New York, Philadelphia, Pittsburgh, Rome, N. Y., St. Louis, San Francisco, Seattle, Washington, D. C.

Install ELECTROMODE Electric Unit Heaters

Easily installed wherever circuit wires can be run, Electromodes furnish heat in-a-minute quickly and efficiently. Factory rooms, exposed areas, isolated buildings, hard-to-heat areas, rooms or departments run overtime when central heating is off are a few of the places where Electromodes furnish the economical heating answer. Heat is circulated by a motor driven fan, through the patented heating element. Adjustable deflectors permit distribution where required. There is no heat loss in transmission and no current is used when not "on".



Cut-away view of rectangular patented Electromode Heating Element.

The heating core of Electromodes is the same as that used so successfully in Electromode Heaters supplied to the U. S. Army and Navy. It consists of a resistor encased in a tubular sheath which is then totally embedded in a one-piece finned aluminum casting. Effective heat conductivity of aluminum aided by the fins dissipate the heat so rapidly that the element operates relatively cool for safety and a long life of maximum heating service. Electromodes are made in a wide range of capacities to meet the widest variety of requirements. ELECTROMODE CORPORATION, Div. of American Foundry Equipment Co., 436 So. Byrkit Street, Mishawaka, Indiana.

Bulletin 45-U and Heating Survey Sheets furnished on request. Write today.

ELECTROMODE
Electric Unit Heaters

Sphere Gaps (124)

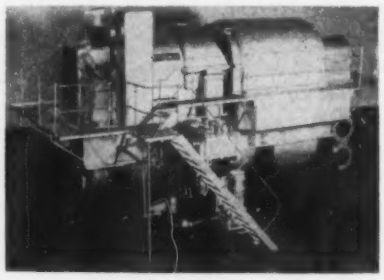
A line of sphere gaps for high-voltage measurements, a-c or d-c, is offered by General Electric. These sphere gaps are available in standard diameters of 2, 6.25, 12.5 25, 50, 75 and 100 cm. for spark-over voltage ranges of 8.5-45 to 261-1, 338-kv. crest and are furnished complete with current-limiting series resistance assemblies.

The 2 and 6.25 cm. gaps are of the table type, with electrodes mounted horizontally in wooden supports. The larger sizes are of the floor type with highly polished spheres mounted vertically in a rectangular frame. All have precision adjustments for gap spacing, it is stated, and sphere gaps of 25 cm. and larger can be secured with casters and a motor drive for gap adjustment. Current limiting resistance assemblies are made of non-inductive, wire-wound rods mounted on treated wooden frames.

In addition to gauging test voltage, these gaps are said to serve as protective devices against overvoltage during testing, to indicate crest voltage regardless of wave form, to be relatively unaffected by humidity changes and to have practically no time lag.

Power Plant Package (125)

A 5,000-kw. power generation unit developed by Westinghouse includes steam turbine, condenser, generator and auxiliaries, in a package and ready to put together. Designed primarily for installation abroad, it is said to be suitable for use wherever ready-designed power plants requiring the minimum of erection time, skill and preparation are needed. It is designed to operate with steam conditions of 600 lb. per square inch, 825° F. total temperature and 28-in. vacuum. It has a fully hydraulic type of governor. The package takes a floor area 31 x 13 ft. and stands 17½ ft. high.

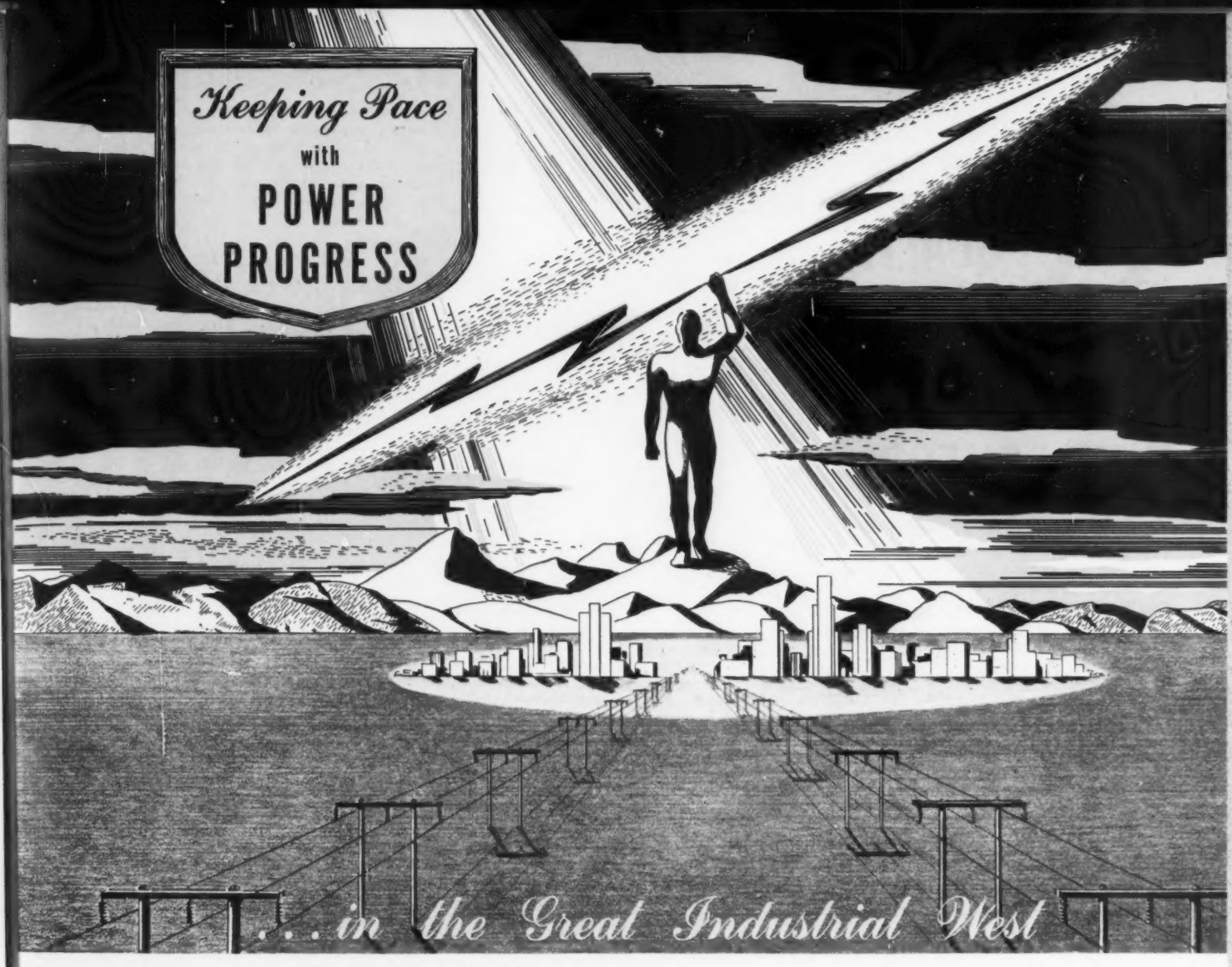


Exposure Meter (126)

G-E has announced an improved splash-proof exposure meter, Type DW-58, which it states is adapted for correct exposure readings for camera, darkroom and for balancing light in the studio. The unit has a new compact, internal-pivot element which is claimed to reduce weight approximately 22%, with a gain in over-all sturdiness. It was first developed for electric instruments used on waterproof walkie-talkie radios and military aircraft.

Heating Coil (127)

Induction Heating Corp. has developed a master coil with removable inserts, designed to facilitate coil changing in setting up thermonic equipment for induction heating applications. According to the manufacturer, these inserts can be changed in a matter of seconds and are available in complete sets which will accommodate diameters ranging from ⅛ to 3 in. in small increments.



. . . SPEEDING RECONVERSION

Through the war years the Electrical Power Industry accomplished outstanding achievements, in the face of seemingly insurmountable difficulties. Girded with the responsibility of speeding conversion from War to Peacetime living, the Power Utilities are making rapid strides in extending their facilities to serve the expanded needs of the West's Great Industrial Empire. To keep pace with this *Progress of Power*, required foresight and careful planning. In consequence, Hubbard's greatly expanded Pacific Coast Plant is meeting the increased demand for *dependable quality* Pole-Line Hardware. You can rely on Hubbard and Company, for your requirements, now and in the future.

HUBBARD POLE LINE

Hardware includes:

- ★ STANDARD POLE LINE HARDWARE
- ★ CABLE MATERIAL FOR OVERHEAD AND UNDERGROUND CONSTRUCTION
- ★ COMMUNICATION SYSTEM HARDWARE
- ★ ELECTRIC RAILWAY HARDWARE
- ★ INSULATOR PINS
- ★ POLE TOP FIXTURES AND STEEL CROSS ARMS
- ★ STRAIN INSULATORS AND CLEVISES
- ★ HIGH TENSION MATERIAL
- ★ SECONDARY RACKS AND ACCESSORIES
- ★ POLE AND CROSS ARM BRACKETS
- ★ WIREHOLDERS AND HOUSE BRACKETS
- ★ EXPANSION BOLTS
- ★ STREET LIGHTING EQUIPMENT
- ★ LIGHTNING ARRESTORS
- ★ RURAL ELECTRIFICATION MATERIAL

HUBBARD

Hubbard and COMPANY

OAKLAND, CAL. PITTSBURGH CHICAGO

HUBBARD

HANG THE LOAD ON HUBBARD HARDWARE

Mr. Tops, the Paragon symbol of top quality.

TOP QUALITY

POULTRY HOUSE TIME CONTROLS

Here are two first quality Poultry House Time Controls. Paragon "PS" models are designed for both morning and evening lighting, with dimming period for roosting. The Paragon Model 301 is designed essentially for morning lighting only. It is a heavy duty, industrial type time switch adaptable to poultry house lighting.

Model "PS" for Morning and Evening Lighting

Model 301 for Morning Lighting Only

Send for Authoritative Bulletin

Paragon has prepared a 4-page, 2 color bulletin containing authoritative information relative to poultry house lighting control. It summarizes the recommendations of leading poultry authorities and gives complete data regarding the wide range of Paragon poultry house time switches. Send for a supply to distribute among your dealers and power companies.

PARAGON ELECTRIC COMPANY
736 Old Colony Building • Chicago 5, Illinois

Paragon Chicago
BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1905

BULLETINS

data books, etc.

Textile Equipment (128)

In a 20-page illustrated booklet, Westinghouse describes electrical equipment for the textile industry, including slasher drives, lint-free motors, loom motors and other specially designed equipment. Importance of good lighting is discussed, and the Precipitron unit is shown in one of the installation photos. Power factor correction and lighting recommendation tables are included, as is a selection table for switch, circuit breaker, wire and fuse sizes for motor branch circuits.

Conversion Factors (129)

I-T-E Circuit Breaker Co. is offering a folder containing conversion factors and formulas. Arranged for use in a loose-leaf binder or for wall mounting, this folder contains more than 600 conversion factors commonly used by electrical engineers, as well as definitions of basic electrical units, prefixes, mensuration and temperature conversion factors.

Anniversary Booklet (130)

A brochure giving the history of the company and its operations has been published by Copperweld Steel Co., commemorating its thirtieth anniversary. About one-half of this attractive 22-page booklet is devoted to installation photos.

Lighting Catalogue (131)

Hub Electric's lighting and control equipment is listed in a new eight-page condensed catalogue. Data and prices are given for items designed for theaters, hospitals, schools, churches, recreation buildings.

Test Sets (132)

The G-E line of portable a-c test sets from 2,000 to 150,000 volts is described in a 24-page bulletin recently released. This bulletin aids comparison of the features and ratings of various standard sets. Portable equipment covered includes small insulation testers, oil testers and larger general-purpose test sets, with ratings as high as 25 kva. In addition, the booklet gives listings and descriptions of sphere gaps and current-limiting resistance assemblies for use with a-c testing sets.

Insulation (133)

William Brand & Co. has prepared a catalogue appendix, covering its electrical insulating materials. Included is reference data on the subject of dielectrics.

Merchant Marine (134)

"This Time Let's Keep Our Merchant Marine" is the title of a 30-page pocket-size booklet published by Westinghouse. This illustrated booklet reviews the history of the merchant fleet, states the problems to be faced.

Silicones (135)

Dow Corning has issued a bulletin on its silicones, including compounds and greases, fluids, varnishes and resins and silastic, a silicone rubber.

Carbon Brushes (136)

Helwig Co. has a new catalogue of its industrial carbon brushes, giving complete description and characteristics of the various grades and styles.

F-Lamp (137)

The fluorescent lamp, its construction and operation advantages, is treated in simple language in the first of Westinghouse Corp.'s "Know-How" Lighting Series. Illustrated.

Transformers (138)

American Transformer Co. has issued a new price list, covering its AmerTran ballasts for fluorescent lighting.

Motors (139)

In a 34-page booklet, Electrical Engineering & Mfg. Corp. describes its line of motors designed for specific requirements. Illustrated.

ELECTRICAL WEST, 68 Post St., San Francisco, 4, California
Please send me information about following CIRCLED items:

100	101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120	121
122	123	124	125	126	127	128	129	130	131	132
133	134	135	136	137	138	139				

Name..... Company*..... Title*.....

Address.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

NOW Sell the Other Half!

Get a bigger share of this Great Potential Market with MITCHELL INDUSTRIAL LIGHTING

ALL OVER AMERICA . . . light-conscious factories need (and are now buying) up-to-date lighting. With a modern Industrial Lighting Department . . . featuring the complete MITCHELL line . . . you can render a *thorough* lighting service . . and get volume business. There are so many "efficiency features" . . . such a wide range of models . . . MITCHELL Lighting is *easier* to sell. Moreover, behind your department stand MITCHELL resources, engineering ideas, promotional helps. All this assures you a big edge on competitors . . . year in . . . year out!

Write for full-size Catalog No. 281 and pocket-size Catalog No. 290. Each tells full story of industrial units . . . each builds sales.

Mitchell Manufacturing Company
2525 CLYBOURN AVENUE, CHICAGO 14, ILLINOIS
West Coast Factory and Sales Office: 1019 N. Madison Ave., Los Angeles 27 Cal.

Makers of: Industrial and Commercial Fluorescent Lighting Equipment
Store Window Lighting • Spotlights and Floodlights • Desk Lamps
Portable Floor and Table Lamps • Bed Lamps
Ultraviolet and Infrared Health Lamps • Residential Lighting Specialties.

MITCHELL
FOR TOP LIGHTING VALUE

Announcement

We take pleasure in announcing, effective November 1, 1945, the appointment of TRIANGLE PACIFIC COMPANY as Western Representatives of Rome Cable Corporation in the states of Arizona, California, Idaho, Nevada, Oregon and Washington.

Inquiries, orders and correspondence should be addressed as follows:

340 AZUSA STREET
LOS ANGELES 12, CALIFORNIA
Telephone Michigan 9671

— or —

1045 BRYANT STREET
SAN FRANCISCO 3, CALIFORNIA
Telephone Hemlock 7246

These offices together with substantial warehouse stocks will be maintained for the express purpose of rendering every possible service to our western customers.

Orders and requests for information addressed to TRIANGLE PACIFIC COMPANY will receive prompt, courteous and helpful attention.

Bare and Tinned Copper Wire
(in rounds, flats and squares)

Bare and Tinned Strand
Weatherproof Wire and Cable
U.R.C., Slowburning

Magnet Wire
Cotton, Asbestos, Paper, Glass

Rubber Covered Wires and Cables
Building Wire — Braided and Lead Covered
Power Cables — Single and Multiple Conductor
Control Cables
Service Entrance Cable
Service Drop Cable
Signal Wire — Single and Multiple Conductor

Rubber Jacketed Cords and Cables
Flexible Cords, Type S, SJ and SV and POSJ
Portable Power Cable — Types W and G
Mining Machine Cables
Arc Welding Cable
Motor Lead Cable

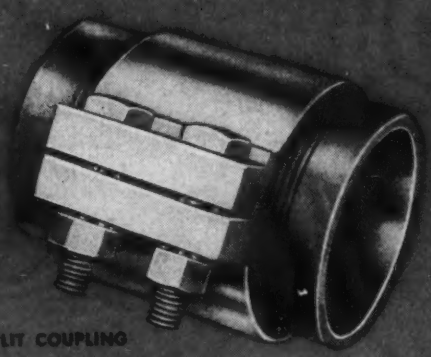
Thermoplastic Insulated Wires and Cables
Rome Synthinol Type T and TW
Rome Synthinol — Machine Tool and Control Wire
Radio Wires — Cotton and Glass Braided
Control Cables

Miscellaneous
Aircraft Wire
Fixture Wire
Motor Lead Wires — Flexible and Extra Flexible

NOW...

INSULATED BUSHING

SOLDERLESS CONNECTOR COMBINATION LUG



SPLIT COUPLING

O.Z. DISTRIBUTORS CARRY COMPLETE STOCKS!

The new three-point O.Z. Distribution Plan makes *more* O.Z. Products *more* available to you, through *more* distributors! Here it is:

1 All products will be sold only through local electrical distributors.

2 These distributors, located in principal cities throughout the United States, will carry large stocks of standard O.Z. electrical products—for immediate delivery.

3 Not only O.Z. *Products*, but also the consulting, designing and engineering service of the O.Z. Company will be more readily available to you, through the co-operation of your nearby distributor.

281

"They're OK if they're O.Z."

O.Z. ELECTRICAL MANUFACTURING COMPANY

262 BOND STREET · BROOKLYN, 2 N. Y.

CONDUIT FITTINGS • CABLE TERMINATORS • CAST IRON BOXES • SOLDERLESS CONNECTORS • GROUNDING DEVICES • POWER CONNECTOR

ELECTRA'S HUSBAND

Bedtime Tale for Grownups

EVERY now and then a newspaper editorial or a radio script really captures the public imagination like the Santa Claus editorial from the 1897 Christmas issue of the *New York Sun*. Something of an epic of the air is the recent *Bedtime Story for the Grownups*, broadcast as a commercial on the Public Service Co. of Colorado "Treasure Trails of Melody" on KOA recently. Electra received a copy of the script from a friend, with a note to the effect that it had been rebroadcast by request as part of a Christmas program. Here it is, minus its dramatic cues:

"HERE'S a little story—a bedtime story; this time for the grownups.

"Tonight at this hour and earlier, thousands of mothers and dads have taken just one last fond look at Junior, or Sue, who has been tucked away for the night. Maybe they have taken a double look if Junior and Sue—or two others—happen to be twins.

"The final, tip-toe visit to the youngsters' bedside is a tradition—a ceremony among American mothers and fathers . . . It started with them while they, themselves, were the tucked-ins—back when their mothers and their fathers were still enjoying the happy, child-raising period of their younger days.

"Just a momentary beam of light is turned on—to see if the little one is properly covered . . . and that her baby head is nestled comfortably on a smoothed-out pillow . . . To see if the dolly, or toy, is close by, where it can be touched and felt and snuggled during some waking moment in the night.

"Yes, just a momentary beam of light—a tiny thing in itself; but it originated in, and was the product of, a huge system of electric machinery and wires—and of men and women, functioning day and night . . . whether to turn the ponderous wheels of a factory, to speed a message, or to brighten a home.

"So, it is not alone what electricity *is*. What electricity does—things big or things little—establishes and measures its value and makes it very much an actual part of our very lives; even as it lights the way to escort a sleepy child to dreamland."

This is just proof, according to Electra, of how the industry can really dramatize its story.

WHEN a visitor at our house recently remarked about a story in one of the national news magazines relating to the incursion of the co-ops into the electric power field, he started a discussion that led to an interesting aftermath. The story related to the formation of Interstate Electric, Inc., at The Dalles, Ore., for the purpose of buying out the properties of Pacific Power & Light Co. It gave a verbal pat on the back to Charles Baker, who will head up Interstate. It did not tell, however, how Mr. Baker had parlayed a $300 investment in Pacific Supply Cooperative, into a $10,000,000 gross business in ten years.

Now some additional facts come to light on the situation in the form of a letter to the editor of the news magazine written by a friend who made a real study of the situation. Here is what he says about co-ops in general and Pacific Supply Cooperative in particular:

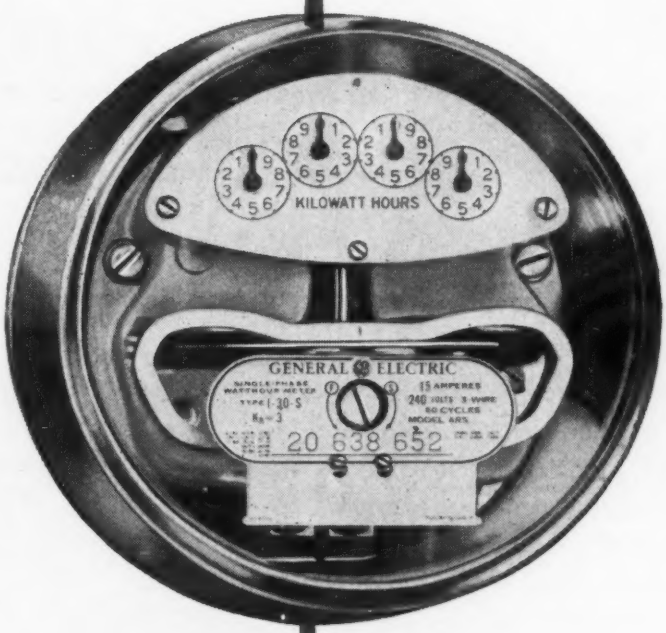
"The sins in reporting are entirely those of omission rather than commission, for what this article did *not* state was that Mr. Baker's cooperative is completely exempt from federal income taxes. Any other business selling the same commodities in any part of the country which showed a profit of approximately $400,000 last year would pay the federal government roughly 65% or $290,000 in taxes, in order to help pay for the war. This would leave roughly $110,000 for expansion, certain reserves and dividends, but not so with Pacific Supply. Not one cent of this tremendous volume of business which was extolled in such glowing terms was touched by the federal tax gatherer. Little wonder that this business grew from a volume of $170,000 in 1934 to $4,000,000 in 1943. Little wonder, too, that profits grew from $950 in 1934 to $353,000 in 1943, or an over-all increase of some 4,000%. These figures come from Mr. Baker's annual report for 1943 and you can search this report and any other that you can find published by the Pacific Supply Cooperative and you will find not a penny paid to federal treasury.

"I should further like you to note another choice bit from this report. On page 8 you will read the story of the Husky Refining Co. in which Pacific owned one-third interest and which it sold in 1943 at a price which produced a capital gain of $270,000. Did Pacific Supply pay a capital gains tax on this sale of securities? Not much! Aided and abetted by the federal treasury, a scheme was 'cooked up' by which this fund was impounded and 'certificates of permanent interest' in the cooperative were to be issued to the membership, with no redemption except upon dissolution of the business. This is an outright evasion of federal taxes and it is also a conspiracy to evade tax liability by employees of the U. S. Treasury and Mr. Baker. As the gentleman says in this report, 'We are advised by the Treasury . . . only by this procedure can we avoid running afoul of the Bureau of Internal Revenue rules and regulations.' If *Time's* reporters were genuinely interested in this situation, there is evidence enough here to call for a federal investigation, since the FBI has moved in on cases in which there was much less evidence. So here you find Mr. Baker paying no federal income tax on the profit of his business and evading the payment of capital gains tax when part of the business is sold at a fat profit. Under such obvious competitive advantages when tax-paying business carries the ball, the growth of Pacific cannot be held to be an achievement of such sublime quality as *Time* would have its readers believe.

"And now let's have a look at Mr. Baker and the Pacific Power & Light situation. If the American Power & Light Corp. is forced by SEC to sell this property, it too will drop into the limbo of Section 101, as an organization of 'farmers and fruit growers' who are tax exempt, for Interstate, Inc., too, will be tax immune. They will be considered just a few hard-working farmers trying to get along in the world. It is interesting to know that in the last three years Pacific Power & Light Co. paid almost $1,500,000 in federal taxes and in the last eight years approximately three million dollars. Who, may I ask, is going to absorb this loss in treasure if this taxpaying enterprise becomes tax-immune by merely becoming a cooperative?"

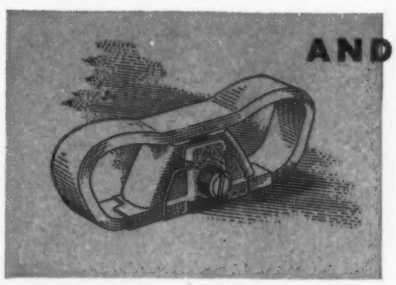
Strange indeed are the devious ways such a simple thing as a law to help the farmer market his crops can be twisted into authority for entering any business on a tax-free basis.

You can count on the



I-30

FOR MAGNETIC STABILITY



AND NO WONDER! At the heart of this meter is a G-E alnico magnet

This surge-resisting magnet owes its stability to (1) all-welded, one-piece construction, (2) careful control of material and dimensions at every step in manufacture, and (3) the inherently high coercive force of alnico. It helps make the I-30 a meter you can depend upon—a meter that maintains its excellent performance under increasing loads in both urban and rural service.

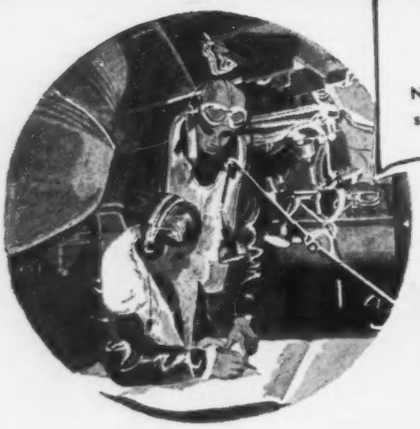
Include the I-30 in your metering program. It's the safe thing to do. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

WATTHOUR METERS

Headquarters for Electrical Measurement

GENERAL ELECTRIC

601-15-6110



YESTERDAY

New lightweight flame resistant wire for Superforts.

Few Americans knew about the revolutionary new rubber insulated wires developed by United States Rubber Company while the war was in progress. But those who did, knew them well.

Our airmen and our Signal Corps men, particularly, saw these new, small diameter wires bring safety, lightness and performance once thought to be beyond reach.

Because of this progress, a complete and even more highly developed line of Laytex and other wires and cables is now available to Public Utilities for their broad expansion... to the Electrical Manufacturer for his new products ... to the Electrical Engineer for his new electrical wire problems.

SAFEGUARDS

THROUGH

U.S. Laytex

Reg. U. S. Trade Mark

SMALLEST DIAMETER
LIGHTEST WEIGHT
RUBBER COVERED WIRE

TODAY

New safety for America's Buildings.

ADEQUATE WIRING SERVES AND SAVES

THE KEY TO THE HOME OF TOMORROW

Serving Through Science

UNITED STATES RUBBER COMPANY

1230 Avenue of the Americas • Rockefeller Center • New York 20, N. Y.

ELECTRICAL WEST

JANUARY, 1946
VOL. 96 NO. 1

HORIZON IS BRIGHT FOR MORE FARM ELECTRIFICATION

*H. B. Walker**
Chairman, California Committee on the Relation of Electricity to Agriculture

CALIFORNIA FARMS are 92% electrified and the postwar programs of our public utilities include plans for the remaining 8%. This is a tribute to the constructive policies of private enterprise in the electrical industry. For 50 years our utilities have pioneered the extension of transmission lines over the undeveloped areas of this state, and almost from the beginning our farms have had a place in this expansion program. It is gratifying to see this same spirit still in action, with a definite program to reach the remaining 10,000 farms heretofore untouched by our expanding network of transmission lines.

This aggressive farm policy upon the part of our utilities has had its rewards, since the farms of California utilize more than a billion kilowatt-hours of electrical energy annually. This is the highest rural consumption for any state in the Union, and our farmers utilize more kilowatt-hours per farm than any in the U.S. It is an interesting corollary in this connection to note that California farmers enjoy the highest gross income per farm, and that our state ranks first in the value of farm products. In 1945 this will total approximately two billion dollars.

The program of California utilities has not been one of building rural transmission lines alone, but also one of load building. For many years they have supported and encouraged research to find out ways and means by which its rural consumers could utilize electricity for greater living comfort and enhanced farm profits. For 21 years the California CREA has been in continuous existence to encourage research supported through grants from the industry. The enviable position of our farmers in terms of total income, as well as gross income per farm, is evidence of the soundness of these programs. Furthermore, our utilities are organized to carry proven research developments into practice through agricultural field men, who are trained to serve farm customers in the interests of the state's agriculture. These men hasten the fruition of research findings to the ultimate benefit of the consumer and supplier of electrical energy.

What is the outlook for rural electrification from the standpoint of utilization, or load building? Practically speaking, the principal job ahead in farm electrification in California is to put electrical energy to work doing things in homes and on farms and in rural areas. The foundation work, consisting of the extension of main transmission lines, is practically completed, but load building remains, as it should, a perpetually unfinished job. In thinking of rural load building at present one might classify expansion in terms of primary and secondary applications. Most of our work in past years has been devoted to primary applications, for such things as household appliances and stationary power, heat, and light applications about the main farmstead. Secondary or indirect applications include primary processing, storage and handling of farm products such as cereal storage, drying and cleaning plants; freezing and locker plants; dehydrators and the like. Applications under these headings may merit a little review to provide perspective for our outlook.

Direct applications for household operations on the farm are not unlike those for urban homes in basic engineering terms, but may be quite different in functional objectives. Progress in the development of these appliances has been rapid and the demand for units high. The replacement market has accordingly attained large proportions. In home electrification, however, replacement of units generally tends toward decrease in loads, due to improved efficiencies in the newer models. In these items new installations must be depended upon to increase loads. For many household appliances market saturation has not been reached and, until this has been attained, load building potentialities remain in established uses. The use of electricity for cooking, water heating, ironing and various forms of refrigeration and cooling, like deep freezing and air conditioning, are far from the saturation stage and are, therefore, attractive load builders in farm electrification programs.

The idea of the electric servant has not been fully exploited. The time is right to do this. The practical elimination of available human help for household and farm duties in recent years, together with the high wage rates now prevailing, affords a splendid opportunity to devise and sell appliances as a means of solving the servant problem. The electric dishwasher, clothes drier, sweeper, floor waxer, are electrical household servants qualified to do hard work better than human hands and at less cost. These approaches in the sale of labor-saving appliances have appeal to rural housekeepers, most of whom have outside farm responsibilities in addition to inside household work and, therefore, appreciate the value of labor-saving devices.

The same general approach applies to the electrification of farmstead operations. Here again, replacement sales do not add to load building because of improved efficiencies in new equipment. This applies not only to the electrical devices themselves, but the attached units, such as irrigation pumps, mechanical refrigeration units

*Presented before the Pacific Coast Electrical Assn., Dec. 7, 1945, Fresno.

California and other Western states produce more than 200 farm crops. While the region leads the nation in farm electrification and in the variety and extent of farm electrical applications and usage, the potential is still great. Dehydrating, precooling, quick freezing, sterilizing, pasteurizing, cooking, sorting, slicing and other essential operations offer opportunities for power, heat, light and electronics

and milking machines. In the former (irrigation plants) the agricultural service men have done much to improve efficiencies and lower costs to utility customers, but this service policy has held customers, extended the use of electricity for pumping, and has definitely contributed to good customer relations. To the pump testing crews, whose services have been given so generously to farmers, belong the credit for an outstanding service to irrigated agriculture in California.

Farm electrification is constantly undergoing change to meet new requirements. New regulations in production standards, new crops, new packaging methods, new labor standards, and many other influences afford opportunities for electricity to serve in new and different ways. During the war our farms were asked to grow all they could, and emphasis on quality was somewhat secondary. In peacetime quality comes first, particularly so as soon as consumer stocks are well filled. There have been no important improvements in sanitation of milk handling methods during the war years. We needed the milk too badly. I venture the guess that more rigid enforcement of existing sanitary regulations, together with some new ones, coupled with high labor costs, will again place emphasis on the desirability of automatic equipment for feeding, cleaning, washing, sterilizing, cooling and storage on farm dairies. The mechanical cooler and refrigerator are developed to a point where more rigid requirements can be readily met, but this is not so for some heating devices. Pasteurizers and sterilizers — electrically operated—do not have complete producer or even public health acceptance in this state. These are fields of application needing research attention, combined with some practical engineering. Feeding and the preparation of feeds for farm animals have never been mechanized on an assembly line basis for economy of operation and labor reduction, yet it is a repetitive farm chore which should respond to mechanization through the use of electric energy automatically controlled.

Food preservation methods have changed in recent years through the introduction and perfection of so-called deep freezing. This has received quick and enthusiastic public acceptance. It is of interest to rural folks as a means of preserving foods in a fresh state for home use, and also as it relates to the specification on raw foods as to maturity and handling which are intended for the frozen market. It doesn't matter so much how the market is organized so far as total electrical utilization is concerned, but just where and how this energy will be used is more uncertain. It is beginning to appear that home freezing, as such, may be on a smaller scale than many originally thought. Generally speaking, we are a prosperous people and we are able and willing to purchase services. For example, home baking was widely practiced in early times, but now central baking is a large industry patronized by practically everyone. Farm folks, more than any other group, are better able to take advantage of direct home preservation of foods by freezing than others, but will they?

The locker plant with food preparation facilities, together with an organized merchandising department affording a wide variety of frozen products for its patronage, seems to be an important part of the frozen food program, whether for rural or urban customers. This may tend to alter our conception of the size and purpose of the farm home frozen-food containers. Locker service does overcome many of the disagreeable tasks in the preparation of foods for freezing on a small scale basis and places certain of these operations in skilled hands.

Food products to be frozen centrally call for production methods and maturity qualities which may be unlike those now demanded for canning and drying. Electrical applications in such fields are yet to be determined. In any case, the frozen food program has a great variety of ramifications of direct concern to the electrical industry.

Poultry production is really big business in California, and electricity is used generously in the business for essential operations, such as incubation, brooding and lighting. Even in these, however, the saturation point is far ahead; with 15 to 16 million hens and pullets on our farms, there are many operations yet to be electrified. Poultry house cleaning is one of these which is now under study. Producers are also seeking ways to mechanically clean battery brooders and, with 12 million birds sold annually as broilers, surely there are opportunities to extend the use of mechanical pickers, and still have left unsolved problems in the utilization of feathers as a by-product. The feeding of poultry is a routine duty and this has labor-saving potentialities, as well as the processing and mixing of the feeds consumed.

Turkey growing, an old established industry for California, has expanded rapidly in recent years, due to the demand for meat. Our production this year of five million birds has set a record. Likewise, California is a great producer of turkey eggs. Some 18 million were produced in 1945, many of which were exported for hatching purposes. This state is first in turkey production and the demand for our products is increasing. Some predict that 40 million eggs will be produced next year. Electricity is doing its part in the expansion of this business, both for brooding and lighting. Effectively lighted poultry yards improve timeliness of egg production, with better hatchability of eggs. California CREA research work has set up the practical lighting specifications now used in this important and growing industry. Perhaps these illustrations are sufficient to show growth possibilities, as well as the effectiveness of electrical applications as a factor in direct-use load building.

We are accustomed to evaluate rural electrification by the volume of use on farms as such, or in other words, through direct applications. I believe it might be worth our while to consider also indirect agricultural applications. Many of these tend to become industrial, but there are certain intermediate steps closely related to farming operations. For example, two decades ago our rice crop was produced with considerable harvest hazard due to fall rains and the necessity of cutting with binders and threshing with stationary threshers. Moreover, grain quality was impaired through atmospheric exposure, causing a deterioration in milling qualities. The use of the combine and the dehydrator have largely overcome these hazards, and such equipment in turn has made it possible to begin harvest

earlier than before, so the fall rain hazards are largely eliminated. You may ask how does this tie in with rural electrification? As a direct application it does not, but indirectly electrification is important.

Consider for a moment the rough rice storage plant at Knights Landing, which has storage facilities for approximately 10,000 tons of rough rice. This plant, with its conveyors, driers, elevators and cleaners, has 33 motors of ¼ to 30 hp., with a total rating of over 360 hp. and a total demand of 125 kw. The drying capacity is about 10,000 bags per day, or 500 tons. The electrical consumption at this plant for the October and November season, now about over, was approximately 73,000 kwh. This 10,000,-ton plant is but one of many in the rice production area of our state. The total crop in 1945 is estimated at 500,-000 tons. This indirect application to agriculture constitutes a primary processing of rough rice, which must be carried out near the crop origin previous to its transfer to the mill, where the hulls are removed, the rice polished and packaged.

In the harvesting and handling of our state's bean crop of 3.8 million bags of 100 lb. each, there is much rough processing to be carried out near points of production in the way of cleaning, grading, polishing and bagging. The same applies to our 320,000-acre cotton crop, which yields over 325,000 bales of lint cotton and approximately 125,000 tons of cotton seed. The advent of the mechanical cotton picker will further increase motor-driven operations at the gin because of the need of leaf removers, burr extractors and lint driers.

Our 30-million-bushel potato crop requires graders, washers, sackers, precoolers and conveyor equipment at the packing sheds. By-product utilization with this crop is still relatively undeveloped.

One could go on and on with the 200 or more farm crops of California and find in all of them both direct and indirect applications of electricity in developing marketable consumer products. Dehydrating, precooling, deep freezing, sterilizing, pasteurizing, cooking, sorting, cleaning, slicing and numerous other essential operations come up in which electric power, heat, light and electronics have places of strategic importance in maintaining California food production standards.

When one speaks of California crops, large units are involved. For example, 4.3 million tons of alfalfa hay; 1.5 million tons of sugar beets; 800,000 tons of tomatoes; 2.6 million tons of grapes; 600,000 acres of vegetables; 2 million bushels of flax; 16 million bushels of rice; 5.5 billion pounds of milk and billions of eggs. These crops total tonnages run into tremendous figures, which means that millions of tons of products must be handled many times from point of origin to final delivery use. This creates a mammoth materials-handling job in agriculture, which has never been studied as a complete engineering problem, and it is principally that. It has been said that when you move an article, such as an agricultural product, you never add anything to it but cost. Naturally, values may increase in nearing a market, but handling en route is an expense which should be reduced to a minimum so far as energy input is concerned. The conveyor, the elevator, the lift, the pump and the blower are used to an increasing degree in agriculture, but still not enough. Conveying equipment, electrically driven, has a bigger place in agriculture than at present and we need to give more specific engineering thought to these problems.

As an illustration, we produce something over a million tons of wine grapes in California. These for the most part are handled in 50-lb. net weight lug boxes, thus requiring 40 million separate box handlings. If these are moved vertically as much as ten feet, over 12,000 theoretical horsepower-hours of energy are involved in this one-way operation. If handled by hand labor, and that is now generally the case, the energy input is very much higher. One cannot say that it is possible to entirely mechanize such operations, much less electrify them, but one can say such problems in agriculture are worthy of our attention.

From the standpoint of farm electrification, we are interested in these related processing and storage plants. The by-products from many of these are valuable to the growth of our livestock industry. Dry beet pulp, alfalfa meal, cottonseed meal, rice bran, garbage, mill feeds and linseed meal are a few of the important by-products from agricultural processing which find markets back on the farm. We use over 800,000 tons of such feeds annually and the more we produce at home the less will be our imports.

How can we encourage this rural load building? The demands for services and equipment are now so large that one may feel indifferent to expansion programs. We are approaching the time, I hope, when merchandise and services are sold rather than merely bought. The industry will benefit from sound salesmanship, as much as the consumer. Both need it. It promotes better public relationships, it improves the quality of merchandise and it tends to keep good merchandise sold and squeezes poor merchandise out. The utilities are much concerned with customer satisfaction in order to maintain loads. For these reasons, I feel that one of the most needed services for load building is sound aggressive salesmanship of appliances and equipment of proven value.

A second need is the enlargement of agricultural service departments, including pump testing. Service to agriculture is essential to sound load-building programs. Such departments must keep before consumers the necessity of adequate wiring; they must know the load characteristics of appliances; they must be judicial in presenting educational material on load-building problems; they must be alert to the advantages and disadvantages of competitive forms of energy, and, if these departments are truly functional, their representatives will be quick to grasp the viewpoints of consumers and do all that is possible to guide their thinking into profitable channels. They will not be prejudiced in discussing undesirable loads such as welders and electric fences. They will promote safety, customer good will, and modern methods. They will maintain close liaison with industry and maintain unquestioned loyalty to their company. They will cooperate with educational and research groups in the interests of sound rural electrification. Such workers in my judgment are the very essence of any public utility's rural program and, therefore, should be maintained at a high level of competence.

Thirdly, research and experimentation should be encouraged on a scale which includes both direct and indirect applications to agriculture. While CREA work is highly important and worthy of increased support, this should not preclude the introduction of appliance and equipment experiments by the various utilities through their agricultural departments. Conservative, fact finding procedures are essential for permanent load building, but proven practices should be aggressively promoted.

Lastly, the most important single factor in rural electrical expansion is the attitude of the top management. Practically all of the suggestions I have made for promoting logical growth can be readily implemented if the utility management is sold on the ideas. An easy system of intercourse between management and its field workers should keep the work well directed, aggressively executed, and up to date in methods. Certainly California utilities have distinguished themselves in such matters and there is no reason to think other than optimistically of the farm electrification outlook in California.

Rural Power Line Telephone Service

Tests prove practicability of rural power line carrier telephone service as means of serving the sparsely settled farm areas. Prospects of early availability of equipment are encouraging

Stanley Rapp *

Pacific Telephone and Telegraph Co., San Francisco

THE problem of providing wire line service to the rural areas is a familiar one to power men, the relatively thin development of these areas making necessary the installation of many miles of pole line to serve a comparatively few customers. As the most economical means of providing communication service in these areas has thus far also been by the use of poles and wire, this condition applies to the communication service as well. Although means have been sought to reduce the amount of investment required for the pole lines, as by the use of long-span construction and by the joint use of poles with the power supply utility in some instances, the costs of providing the service thus far have been such that many localities are not adequately served or they are receiving service of a substandard grade.

Carrier systems have been in use for about 20 years to obtain communication channels on open-wire telephone lines, in addition to those obtained on a voice-frequency basis, or as land wires for telegraph; and more recently these systems have been applied to circuits in cable, both to paired facilities and to coaxial. Carrier systems have also been in use for some time to obtain communication and control channels on power lines without the need to string additional wires for these purposes, but usually the channels thus obtained have been on a point-to-point basis and used principally in connection with the operation of the related power system. The radio broadcast programs are a familiar use of the "carrier" principle. All of the radio stations operate simultaneously, of course, and the individual person selects the desired program by tuning his receiver. In the carrier systems as applied to telephone or power circuits, the "tuning" on each channel is usually obtained by a fixed network. The application of carrier systems to rural power lines to obtain talking channels for rural telephone service is largely, therefore, a further application of techniques already known.

The usual type of telephone circuit provided in the rural areas by the utility companies is generally known as a "suburban circuit" and has usually been obtained by a means of pole line and wire. Such a circuit provides a two-way talk from any station without requiring the telephone customer to manipulate his equipment in any way, as in the case of the "push to talk" feature that applies on some of the radio communication sets. Any customer may signal the "operator" at the central office and obtain a connection to any other circuit in the exchange or to a long-distance line; and the operator may call any station, usually by the ringing of a bell, in the case of an incoming call to the customer. By equipping the stations with a dial, the connections at the central office may be obtained by means of machine switching equipment located at that point. The usual suburban circuit may serve as many as ten customers, and in some cases the customers may call other parties on their line without the assistance of the operator.

In many locations, the poles and wire constituting the circuit are owned by the customers who use it, and such a circuit is usually known as a "farmer line," the customers usually being farmers. The type of service provided is similar to that provided by the utility owned suburban circuits, but it is frequently difficult to obtain proper maintenance attention for these lines, with consequent adverse effect on the grade of service provided. It is expected that the use of power line carrier systems to provide telephone service in rural areas may be an effective means of reducing the necessity for this type of circuit.

Where the communication service in the rural areas is provided by carrier systems applicable to the power distribution lines, it is necessary that the circuits so obtained provide service similar to that now obtained by means of poles and wire. That is, the operating features of the equipment at the customer's station, and of that at the central office, must be similar to those of the equipment now used; and the system must be adaptable to dial operation. Two-way talk must be provided for any station and universal connection through the exchange; any customer may talk to any other station on his circuit, and any customer may be signalled to his telephone, as by the ringing of a bell.

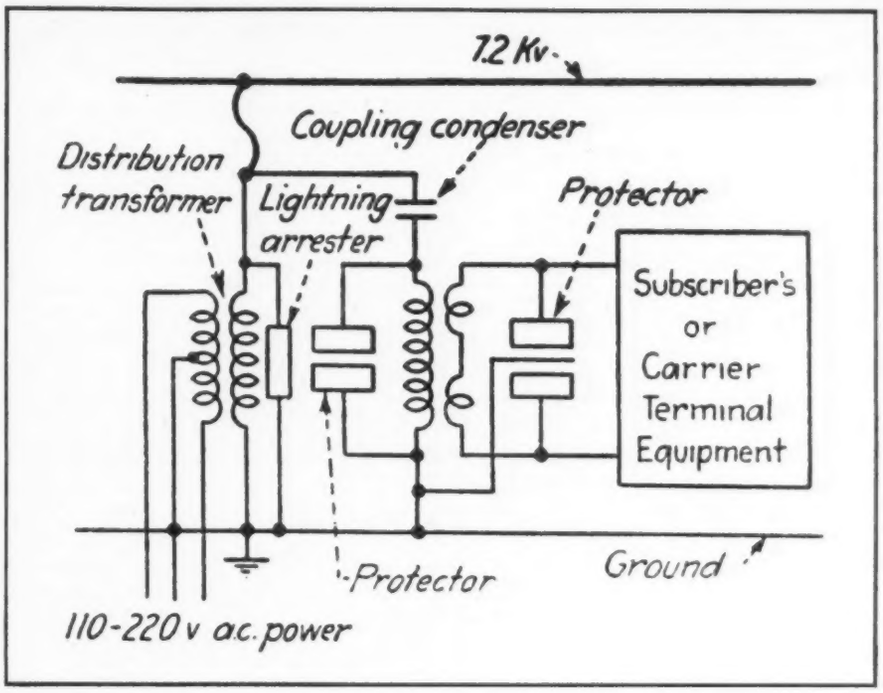
Development work on carrier systems suitable for this purpose was undertaken before the start of the war, which resulted in the construction of model sets and a trial of their operation. This work has been resumed, and further field trials are expected early in 1946. A few systems may be available for installation later in the year.

The customer's equipment associated with these systems will probably look like a table type radio set, except that it will be equipped with a hook-switch and a hand telephone set, an early model having this appearance. It will also be equipped with a dial, if it is to operate with a machine switching central office. It will contain vacuum tube equipment to provide a receiving and a transmitting system, and the necessary filters and relays to provide for the proper functioning of the station. The power supply for the vacuum tubes is to be drawn from the normal 110-volt a-c supply at the customer's house. The receiving circuit will remain at least partly energized continuously, so as to be able to receive incoming signals at any time, and the transmitting circuit will be partly energized, so as to respond promptly on the lifting of the switch-hook. The set will have a lamp, which will show when the circuit is in use by other parties and thus avoid the breaking in on a busy circuit by any other customer which it may serve. Two carrier frequencies will be used, one for transmitting and one for receiving, and these will normally be such as to coordinate with the receiving and transmitting frequencies at the central office end of the circuit. A switch is to be provided to interchange the frequencies at any station, so as to permit conversation between two stations on the same channel, this switch being automatically restored when the hook-switch is depressed. It is expected that any one-carrier circuit will serve as many as six customer's stations.

Terminal equipment at the central

* Report of a talk before Operating Economics Section meeting, PCEA, Fresno, Calif., Dec. 7 and 8.

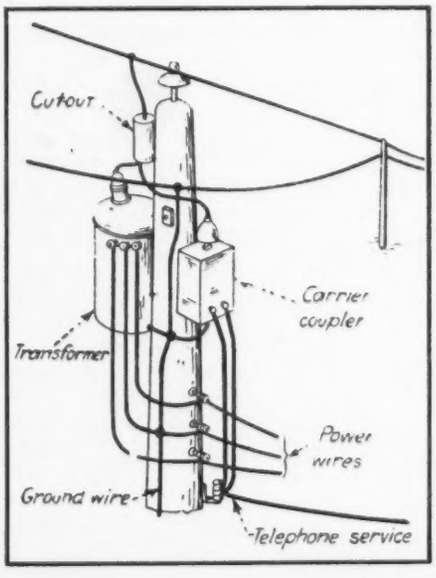
Fig. 1—General circuit arrangement of distribution transformer and coupler



office end of the carrier circuit generally will not be in the central office itself, but probably at the edge of the town development, where access can be had to the power line feeder on which the carrier circuit is to operate. Telephone circuits between this terminal and the central office will be provided by the conventional means, usually by circuits in cable. The carrier terminal will contain vacuum tube equipment, the power supply for which will be obtained from the usual commercial source adjacent to its location. It will provide means of junctioning between the voice-frequency and the carrier-frequency sections of the circuit, and means of recognizing and translating in a suitable manner the various signalling features of the circuit, such as the lifting of the switchhook or the operating of a dial at the customer's station or ringing current from the central office.

Power lines on which these carrier systems will normally operate are those usually used for the distribution of power supply service in the rural areas, these usually being operated at 12 kv. in the California areas. Connection to these lines at the carrier terminal and at the customer's stations will be by means of a coupling condenser and a transformer. It will generally be necessary to treat any branch in the power circuit to avoid adverse effects on the transmission at carrier frequencies that might otherwise occur. Various types of equipment will be necessary for this purpose, chokes of a fairly simple design being suitable for blocking access of the carrier frequencies to any particular branch and more complicated networks, to provide access for some frequencies and not for others. Any equipment connected to the power lines, of course, will be installed and maintained by power company forces.

Fig. 2—Pole top for power line carrier



Use for other types of carrier systems is also expected. One of these would make use of a terminal in town and another at a remote point, with the connections between the latter and the individual customers provided by conventional poles and wire. Several such systems may be installed between two points to provide trunk circuits between an isolated dial operated unit, usually known as a concentration unit, and the central office. Systems similar to those designed for operation on a power line may also be used on a telephone open-wire circuit.

As already indicated, each carrier circuit or two-way talking channel will require two carrier frequencies, one for transmission in each direction. Frequencies in the range of 150 to 500 kilocycles are proposed for this purpose, and it is expected that five separate two-way channels can be obtained within this range. The five circuits thus obtained will be the maximum that can be operated on any one carrier route, such as on any one power distribution feeder, as the operation of more than one circuit on the same frequencies would result in serious crosstalk. The provision of a separate route through any power network for this purpose may be obtained by the suitable application of carrier frequency chokes and filters at the various branch points concerned. It probably will be necessary to provide couplers to bridge any switch in the power network so that the operation of the carrier circuit may be independent of the setting of such a switch. The installation of additional couplers may also be necessary to provide suitable carrier paths where the area to be reached by the telephone circuit is served by separate distribution networks or by power systems of different ownership, as occurs in some instances.

Fig. 1 shows the connection of the equipment to the power line at a customer's station. It will be noted that a power distribution transformer is included, which provides power supply to the house, and incidentally to the telephone station equipment. Connection of the carrier circuit to the power line is shown to be by way of a coupling condenser and a transformer. The latter is equipped with a suitable protector, and a protector is provided between it and the customer's station equipment. The general arrangement of the distribution transformer and coupler on the pole is shown by Fig. 2. The various connections concerned in the application of a carrier circuit to a power line are shown by Fig. 3. The network at the left of the diagram acts to block access of the carrier frequencies to the rest of the line in that direction. Connections to the carrier terminal are shown, and it will be noted that these include the power supply for the terminal as well as connection for the carrier channel. Connections shown for the customer's station are similar to those shown by Fig. 1. The network in the first branch circuit to the right provides access of a suitable channel to this branch. The choke coil in the next, blocks all access to that branch. The network at the far right acts to sectionalize the power cir-

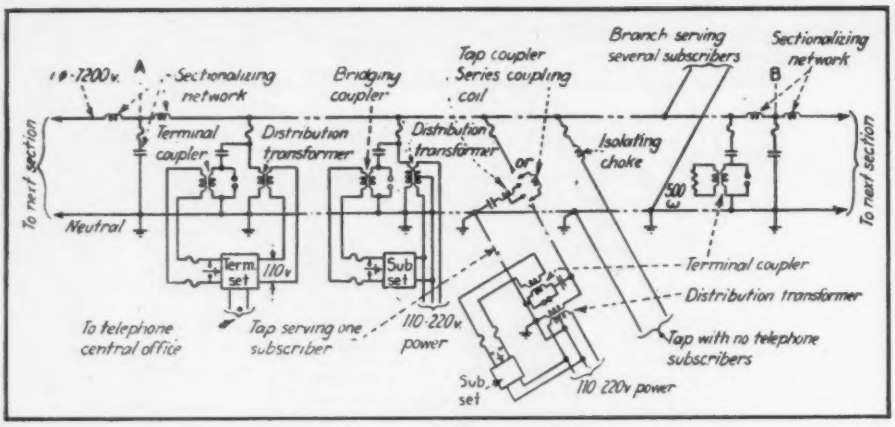


Fig. 3—Power line carrier connections

cuit at that point with respect to the carrier frequencies, and the network to the left of this provides a resistance termination to the carrier circuit to avoid reflection effects.

Equipments thus far designed, and on which trials have been made, contemplate connection to a single-phase distribution circuit consisting of one phase-wire and a multi-grounded neutral. Most of the power distribution systems operating in the rural areas of California are three-wire three-phase systems and are grounded only at the substation. Although the techniques applicable to the single-phase multi-grounded circuits should generally be applicable to the three-phase systems, further development will be necessary to obtain application of the carrier systems to these circuits.

Carrier systems applicable to power distribution lines and suitable for rural telephone service offer a means of supplying this service at costs less than those required for the conventional poles and wire under some conditions. There are many technical features yet to be developed with respect to the practical application of these systems to the power networks. Extent of their application will depend, of course, on their cost relative to the costs of providing the service by more conventional means, as by poles and wire. The more remote or thinly developed areas which have no existing telephone service present the greatest possibility for the use of these carrier systems.

Electric House Heating Seminar

UNDER auspices of the Electric Heating Society, utility men and manufacturers met for a two-day electric house heating conference in San Francisco Dec. 5 and 6. The meeting attracted thirty or more representatives of both public and private power, one from as far away as Tennessee and several from the Pacific Northwest, who placed before the group current experience and data on every phase of this live topic. Plans for comprehensive tests to determine characteristics of electric space heating were presented by J. H. Polhemus, president of Portland General Electric Co. He is spending fifty to sixty thousand dollars on graphic demand meters and other facilities to conduct tests which are now under way. By a year from now, he expects to have factual and reliable information upon which to determine a house heating policy for his company.

Buford H. Martin, TVA, presented space heating developments in the Tennessee Valley. One thousand homes are now electrically heated under climatic conditions averaging 3,200 degree-days. Houses heated are confined almost wholly to small homes with volume between 6,000 and 9,000 cu. ft. Fourteen such small homes averaged 7,410 kwh. for the heating season. Average consumption of five larger homes was 13,656 kwh. and, on a group of thirty homes, the average was 12,052 kwh., or 1.35 kwh. per cubic foot at a cost of 7.4 mills per cubic foot on the standard TVA residential rate. Average price for all energy sold to residential consumers on the TVA system was 1.85 cents per kwh. Demand readings taken on one group of six houses having a total connected load of 162 kw. showed a maximum 30-minute demand of 49.5 kw., or a diversified demand of 8.25 kw. per house for space heating, cooking, water heating, refrigeration and lighting. This occurred between 8 and 8:30 a.m. Maximum hourly demand was 37.5 kw., which occurred between 6 and 7 a.m. when the outside temperature was 28°. During a previous check, a 30-minute demand of 57.5 kw. was recorded with 10° ambient. Load factor for a 24-hour period for a single house was 76%. Annual load factor is about 15%. It is concluded from rather limited data that electric space heating has good diversity and is good business and it is planned to sell a large part of war-released TVA generating capacity for electric space heating.

Some of the best information on load characteristics of electric space heating available anywhere in the country was presented by Harry G. Kelsey, manager of the PUD at Longview, Wash. This information with charts was published in ELECTRICAL WEST for September 1945, p. 90. Kelsey supplemented published material with a recent study on costs of serving space heating load, which showed that for his system it is profitable business at an average consumer rate for his electric heating load of 6½ mills per kwh. Paying an average rate of 2½ mills per kwh. to Bonneville for purchased power, he figures that he comes out at the end of the year with a profit of $20.81 per heating customer, based on a diversified demand of 5 kw. per house and taking into consideration all costs of serving the load.

Both Kelsey and Polhemus, as purchasers of Bonneville power, said that the price of Bonneville power would have to be reduced or that that portion of distributors retail sales going to house heating would have to be specially priced, if any volume of space heating business is to be developed. J. B. Cochran, who represented Bonneville at the meeting, said that the administration was fully cognizant of the rate situation and that the problem was in the process of being worked out. As a temporary measure, he said that a ceiling may be placed on energy sold for house heating until new schedules can be prepared. Cochran, in discussing BPA's space heating development program, said that electric house heating can play an important role in absorbing power from multi-purpose federal developments.

Progress of electric space heating in California was discussed by William B.

Bruere, electrical engineer, State of California, who said there was more electric space heating load on the lines of the power companies in northern California by several times over than in all the rest of the country combined and that rates of the Pacific Gas and Electric Co., which largely serves the area, were quite favorable to further development of this type of load. Effects of house insulation on consumption, installed capacity, demand and diversity were presented by I. F. Hunsacker, Wesix Electric Heater Co. He showed that a five-room, 9,000 sq. ft. (7,200 cu. ft.) uninsulated house would require an hourly heat input of 48,000 B.t.u. and 14 kw. installed capacity, whereas, if the house were heat insulated, heat input requirements would drop to 19,000 B.t.u. per hour and installed capacity to 5½ kw. Diversity would be greatly improved and consumption would be reduced by at least one-third.

The several means of applying electric heat to houses were analyzed by S. L. Forsyth, Westinghouse Electric Corp., and, according to a study he has made of the six systems that might be employed, he found that on a merit point basis, unit space heaters, individually thermostatically controlled, rate decidedly at the top of the list in preference. R. L. Haden, sales manager of Coast Counties Gas & Electric Co., said his company was serving six engineered electric house heating jobs during the present winter and that, if things work out as anticipated, they will go all out for house heating next year. He figures that the average house can be electrically heated in his territory for $60 to $65 a year, with most of the heating falling in an 8-mill block. Their entire program will be a cooperative set-up with dealers.

A feeling that the free interchange of information, experience and plans by those attending the conference would result in a sound engineering solution to all problems was expressed by General Chairman Thomas J. Mellon, Wesix Electric Heater Co.

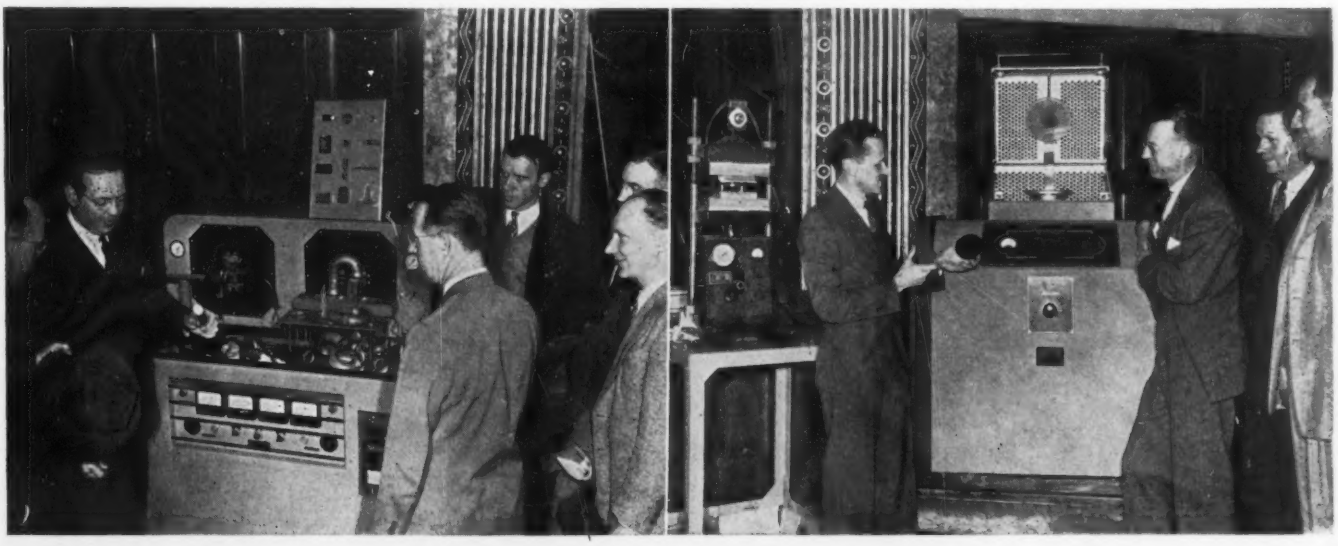
High-Frequency Heating Conference

PRESENT and prospective users of high-frequency heating for industrial processes, as well as manufacturers and distributors of equipment along with utility men, learned a great deal about this new production tool at a most successful conference held in Los Angeles, Dec. 3 and 4, under the auspices of the Pacific Coast Electrical Assn. The meeting, which attracted more than 500, was sponsored by a number of technical and metals societies of the south under the chairmanship of G. N. Hawley, manager of industrial sales of the Southern California Edison Co.

Technical details of apparatus for producing high-frequency power, theory and formulae for calculating power requirements and heat penetration, experience of users, and some of the possibilities that lie ahead were included in the two day and one evening sessions. In promoting high-frequency heating, all agreed that it should be sold as a production tool and not applied on a competitive B.t.u. basis to mass heating jobs. The mistake was made following the first World War of selling industrial electric heating on a competitive fuel basis and many installations later came out. This mistake must not be repeated, said H. H. Douglas, Southern California Edison Co., in discussing the function of the utility in high-frequency applications. He said the utility should play a liaison role between the customer and the seller of equipment or service, to the end that user and seller be brought together; that the customer get a well engineered job and reputable equipment, and that the application be made on a sound economic basis.

Dr. R. A. Nielsen, Westinghouse Electric Corp., in charge of his company's new high-frequency laboratory in Los Angeles, covered frequency effects in induction and dielectric heating. He showed that the familiar laws of electrical theory and thermodynamics apply as well to electronic heating and that in most cases it is possible to calculate applications with considerable accuracy. Among a number of papers dealing with equipment, specific applications and techniques, were presentations by: W. S. Williams, Allis-Chalmers Mfg. Co.; Harlan A. Messner, Ohio Crankshaft Co.; Fred M. Arnold, Norris

Demonstration of equipment after each session was an important part of the high-frequency heating conference



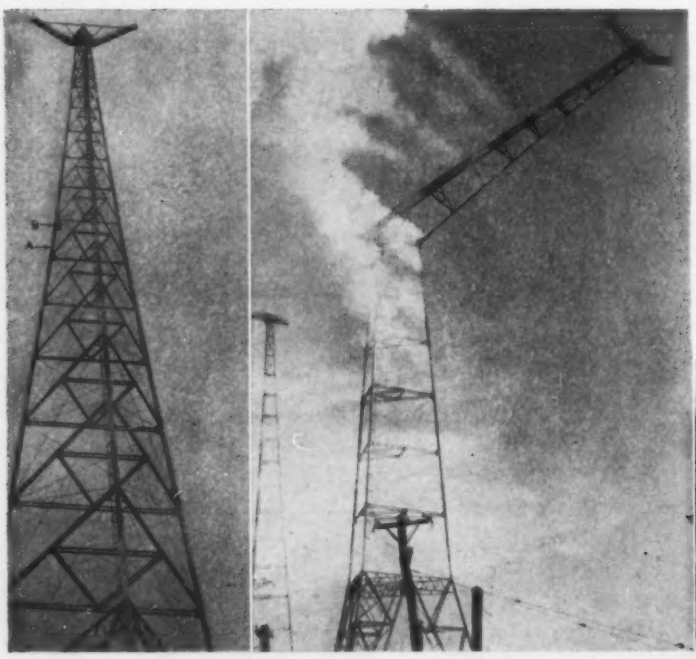
Electronic heating apparatus of Ohio Crank Shaft Co., Westinghouse, RCA and Airtonics Mfg. Co. were on display

Stamping and Mfg. Co.; J. Max Lee, Ajax Electrothermic Corp.; R. W. Steenrod, General Electric Co.; Leonard Smith, Leonard Smith Co.; Herman A. Folgner, Handy and Harmon; V. Elconin, Airtronics Mfg. Co., and E. S. Winlund, Radio Corp. of America.

With high-frequency load doubling every four years and now totaling 350,000 kw. in the United States, Kenneth A. Smith, Electronic Chemical Engineering Co., predicted rapid strides in both induction and dielectric heating. He especially dwelt on possibilities of dielectric heating for sterilization, pasteurization and enzyme control in foods and drugs. Pasteurization of beer is a late development in this field. Smith and associates pasteurize beer in four seconds, as against 47 minutes required by present methods, and with better quality, no bottle breakage and greater shelf life. Cost is not as great as the power that is used to run conveyors with the present 159° hot water process. Vegetables and fruits in sealed tin cans can be thoroughly sterilized and cooked in a matter of seconds. Enzymic action can be allayed in fruits and juices. Dehydration of fruit is a large field of proven practicability. Sterilization of food placed in sealed film bags is a proven application with the expectation that the food will last indefinitely. Demothing of garments and goods is being done. The molecular heating cooks and kills the moth eggs within their shells, where nothing else will touch them.

Precooking of meats to kill hoof and mouth disease and other germs without affecting quality of the meat has been accomplished and offers a big field. Preventing bread from molding, thawing out frozen foods and drying materials of all kinds were only a few of many other applications he discussed. Several speakers brought out the fact that there is a large amount of high-frequency generating equipment now idle in southern California because of cancellation of war contracts and that the first selling job is to find uses and users for this equipment and put it to work.

So successful was this first Pacific Coast high-frequency heating conference that similar seminars will probably be held in other cities up and down the Coast.



Removal of two old 600-ft. steel radio towers became necessary after recapture of the Philippines. Speed of removal was of such importance that unusual means of demolition was adopted. Charges of TNT (78-lb.) were placed at points A and B to blast out a 20-ft. section on one of the three tower legs. The two points were so selected that the top section in jack-knifing would fall short of the ground, crashing into the lower section, so weakening it that it would collapse. Everything worked as planned. Comdr. C. T. Wende, 77th Naval Construction Battalion, was in charge of demolition operations

Induction and Dielectric Heating Data

Dielectric Heating Formulas*

1. Capacity of a parallel plate capacitor:

$$C = .224\ e' \frac{A}{D} \times 10^{-12}\ \text{(farads)}.$$

C = capacity (farads).
e′ = dielectric constant.
A = electrode area (sq. in.).
D = distance between electrodes (inches).

2. Power input into a dielectric:

$$P_v = 1.41\ f\ E_1^2\ e''\ \text{(watts/cu. in.)}$$

P_v = power density.
f = frequency (Mc/sec.).
E_1 = kilovolts/in.
e″ = loss factor.

3. "T" network equations:

$$\frac{R_a}{R_b} = \frac{X_1 + X_3}{X_2 + X_3}$$

$$R_a R_b = X_1 X_2 + X_1 X_3 + X_2 X_3$$

R = resistance (ohms).
X = reactance (ohms).

4. Effective series resistance of a capacitor:

$$R = X\ (PF)\ \text{ohms}.$$

$$X = \frac{1}{WC}\ \text{ohms}.$$

$W = 2\pi f$.
C = capacity (farads).
PF = power factor.

5. Dielectric loss factor:

$$e'' = (PF) \times e'.$$

e″ = loss factor.
PF = power factor.
e′ = dielectric constant.

6. Wave length along electrodes:

$$\lambda = \frac{984}{f\ e'}\ \text{(feet)}.$$

λ = wave length (feet).
f = frequency Mc/sec.
e′ = dielectric constant.

7. Voltage gradient in any dielectric layer in parallel plate capacitor with parallel layers of different dielectrics:

$$E_1 = \frac{E \times 10^{-3}}{e'_k \left(\frac{a_1}{e'_1} + \frac{a_2}{e'_2} + \ldots + \frac{a_n}{e'_n} \right)}\ \text{kv./in.}$$

E_1 = voltage gradient (kv./in.) of layer considered.
E = total electrode voltage (volts).
e'_k = dielectric constant of dielectric layer considered.
a_1 = thickness of first dielectric layer (inches).
a_2 = thickness of second dielectric layer (inches).
a_n = thickness of *n* th dielectric layer (inches).
e'_1 = dielectric constant of first dielectric layer.
e'_2 = dielectric constant of second dielectric layer.
e'_n = dielectric constant of *n* th dielectric layer.

*Data compiled by the Industrial Electronics Division, Westinghouse Electric Corporation, Baltimore, Maryland.

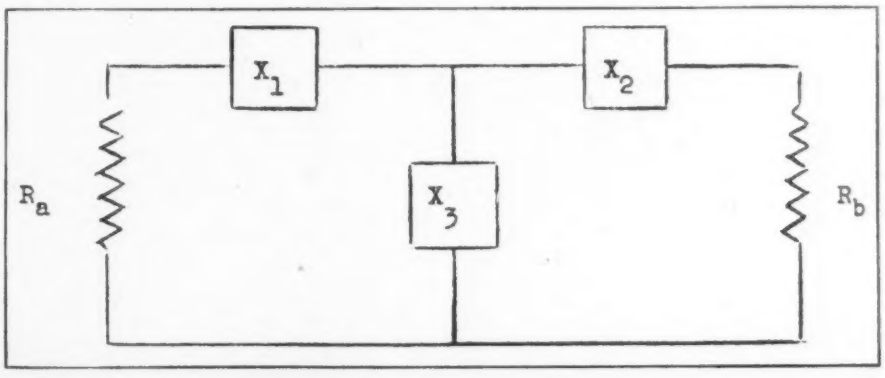
Physical Constants of Metals

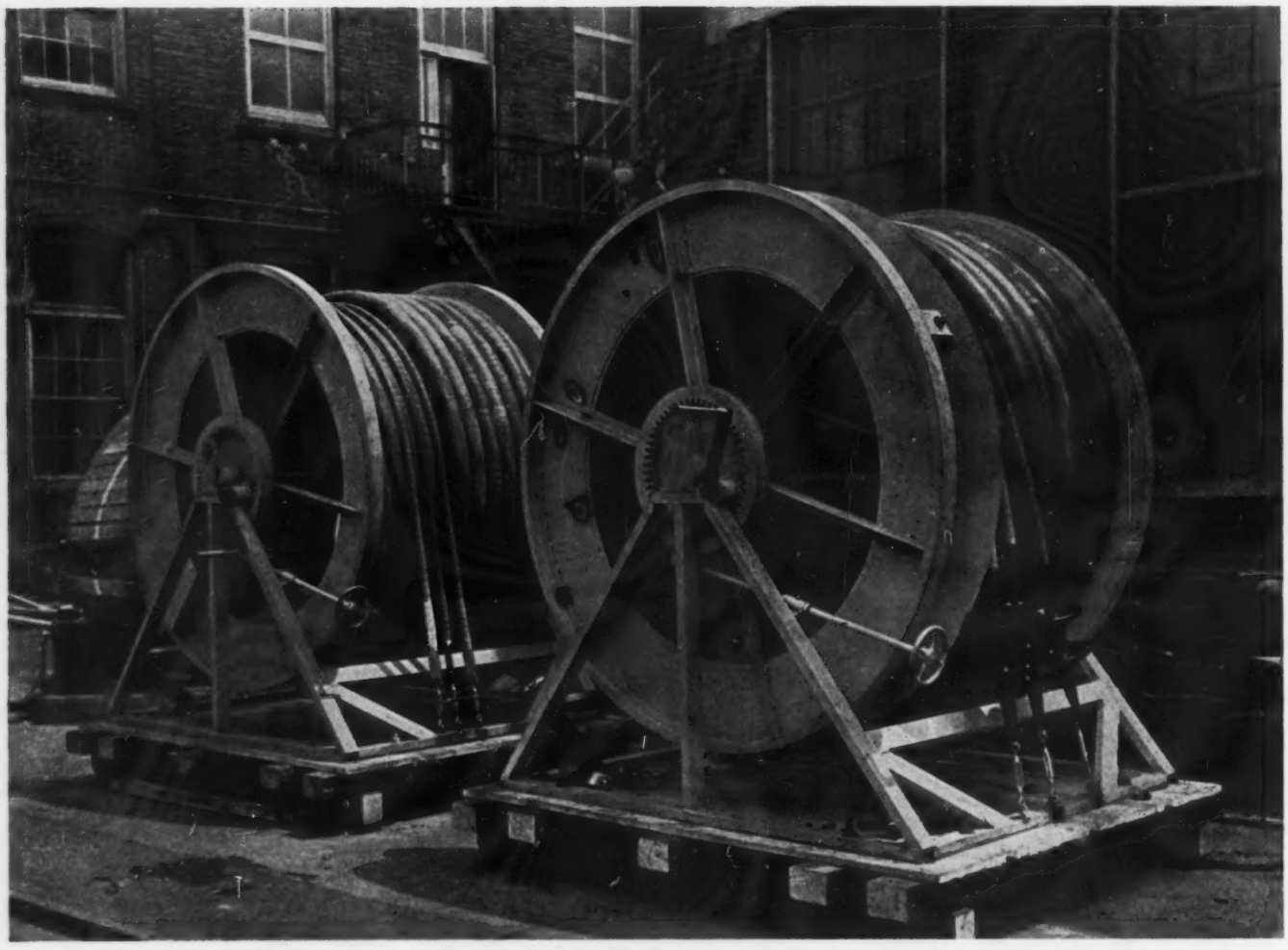
(20° C Unless Otherwise Specified)

Material	Resistivity Microhms/CC	Temp. Coefficient of Resistance	Specific Gravity	Specific Heat	Coeff. Thermal Cond.
Aluminum	2.688	.00403	2.70	.214	.5
Barium	9.8	.0033	3.78	.068	...
Beryllium	10.1		...	.397	...
Brass	8	.002	8.6	.092	.204
Bronze	17.8	.0005	8.8	.086	...
Carbon	3500 at 0°	.0009	3.52	.165	...
Calcium	4.59	.00364 (0-600)	1.54	.157	...
Chromium	2.6 at 0°		6.92	.11	...
Cobalt	9.7	.00658 (0-100)	8.71	.10	...
Copper	1.724	.00393	8.89	.0921	.918
Gold	2.44	.0034	19.3	.0312	.7
Graphite	800 at 0		2.25	.17	...
Iron	9.8	.0065 (0-100)	7.8	.107	.161
Iron cast	79-104		7.03	.118	...
Lead	22.0	.0039	11.4	.0306	.083
Magnesium	4.46	.004	1.74	.246	.376
Manganese	5		7.42	.121	...
Mercury	95.8	.00089	13.59	.033	.015
Molybdenum	5.08 at 0	.0047 (0-100)	9.0	.065	.346
Monel metal	42	.002	8.9	...	.062
Nickel	7.8	.00537 (20-100)	8.9	.105	.142
Platinum	9.83 at 0	.003	21.4	.0324	.166
Potassium	6.1 at 0	.0055 at 0	.851	.19	...
Silver	1.629 at 18	.0038	10.5	.056	1.0
Sodium	4.3 at 0	.0054	.951	.295	..
Steel (soft)	11.8	.004	7.7	.118	.115
Steel (hard)	45.6	.0016	7.7	.118	.115
Steel (nickel)	30-85	.0007	7.7	.118	.115
Tantalum	15.5	.0031	16.6	.036	.130
Thallium	17.6 at 0	.0040 at 0	11.86	.038	...
Thorium	18	.0021 (20-1800)	11.5	.027	...
Tin	11.5	.0042	7.3	.054	.155
Tungsten	5.5	.0047 (0-100)	19	.034	.476
Zinc	5.75 at 0	.0037	7.1	.093	.265

NOTE: Data compiled by the Industrial Electronics Division, Westinghouse Electric Corporation, Baltimore, Md.

"T" network to which equations under 3 apply in dielectric heating calculations



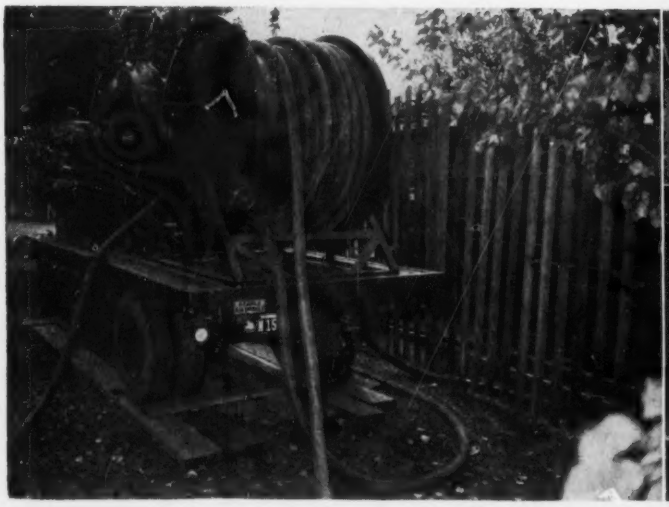


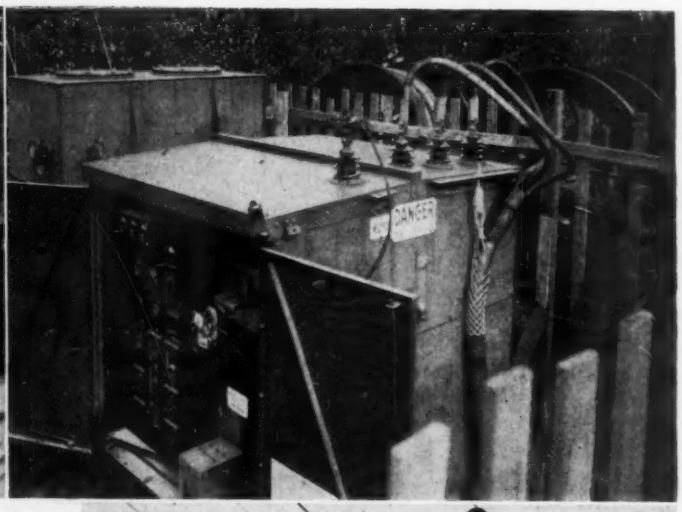
CABLE CONNECTIONS FOR MOBILE SUB

SPECIAL primary and secondary cables recently purchased by Pacific Gas and Electric Co. have greatly added to the versatility and usefulness of the company's mobile substation. Special features of the cables, made by The Okonite Co., and some typical field installation scenes are shown in the accompanying photographs.

Field pictures were taken at Centerville, a small town near Oakland. Here the 2,500-kva., 11- and 22-kv. to 4-kv., General Electric mobile substation was being used to take over while the substation was killed, so that the induction regulators could be taken to the Emeryville shops for servicing. This illustrates one of the several important uses for mobile substations.

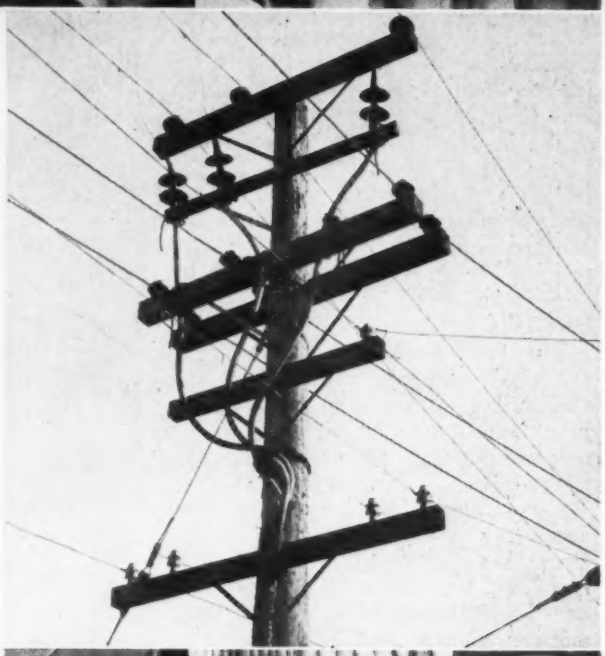
Before the special cable was purchased, it was often necessary to set a temporary pole before overhead con-





nections could be made. Now, cutting in the mobile substation is a simple job that can be done in a matter of minutes instead of sometimes hours, if it was necessary to set a temporary pole. This saving of time in making connections is of great importance since the mobile substation is normally used for supplying emergency service. Aside from the special construction of the cable for rough and repeated handling, another important feature was added — that of permanent factory made pigtails at both ends. The three conductors of each cable are color coded to facilitate phasing. Two factory built steel cable reels are mounted on a separate truck as shown.

Portable power cable leads wound on special reels mounted on temporary skids ready for shipment (at top of opposite page). Feature of this Okocord cable that is used instead of open wires for making connections to mobile substations is the factory equipped molded crotch pigtails at each end. Reel at left contains a 600,000-cir. mil, 5,000-volt cable for the secondary side of the mobile sub transformer, while the other reel holds a 1/0, 22,000-volt cable for the primary connection. Reels are provided with special driving gear and brake for manual take-up

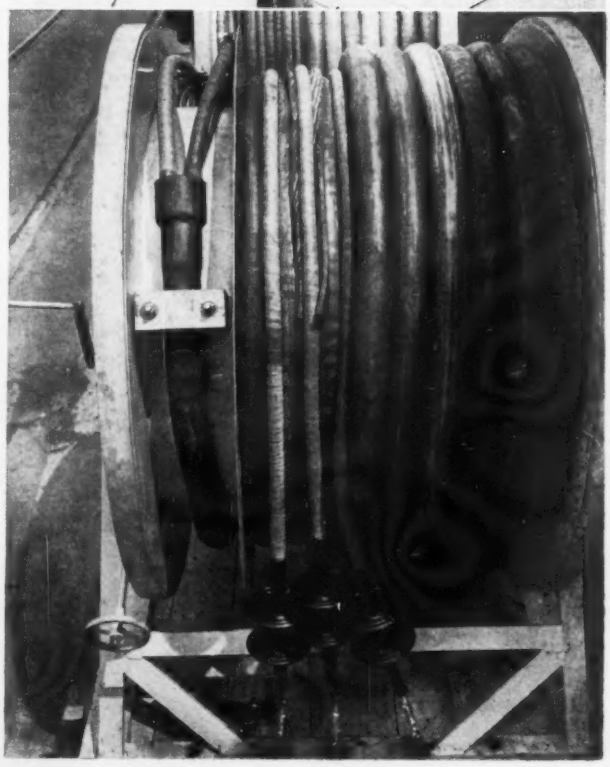


Mobile substation inside picket fence to left (lower on opposite page) supplies load, while regulators at permanent substation seen at the right are taken to shop for maintenance. Because of the orchard it would have been necessary to set a temporary pole to make 11- and 4-kv. connections, had it not been for the cable leads now used. The 11-kv. cable tap riser may be seen lashed to the second pole to left and 4-kv. lead on third pole

Special reels (top left) for portable cable are mounted on permanently assigned truck. Mobile sub is inside of the fence

2,500-kva., 11- and 22-kv. mobile substation at top right showing secondary connections. Cable reels are shown in background

Primary connections conveniently made with factory provided pigtails with molded insulators on ends (center at right)



Lower right, 22-kv. cable lead showing molded insulators on pole end and molded crotch for substation end. Pole end is provided with three 12-ft. Okoprene-protected pigtails, with two molded insulators in tandem and standard lugs and molded crotch. On the substation end there are two pigtails each 7 ft. long and one 5 ft. long with insulated grounding wire molded into crotch in this end only. The special reel has a flanged separated section for protection of the insulators on pole end of cable. Pole end of cable is first payed out and then enough turns on the other end are taken off to reach high-tension connections on mobile sub. Secondary cable connections are made in similar manner. Each cable is 250 feet in length

How Pressure Groups Influence the Code

James Moore Evans
Electrical Engineer

THE ones who have the best interests of the National Electrical Code at heart are not the only ones who are taking an active interest in its provisions and their enforcement.

Practically every city, many counties and some states in these United States have enacted regulations based upon the provisions of the Code and these ordinances and laws very frequently affect many classes of people.

Laws and regulations are always restrictive and it is possible to so manipulate them that a particular group may be benefited, greatly.

The leaders of such a group would be more than human if they did not feel that anything that would benefit their group would be of value to the country as a whole. They see a chance to gain power, wealth or prestige by "minor changes" in the Code or the laws that implement it.

They will appear before the code committee with samples, examples and charts. They have taken enough time in preparation to be able to make a polished, smooth, persuasive presentation.

Every angle has been considered and every possible objection studied. Every key personality has been analyzed and they bring to bear on each one the influence, wine, women, song, money, politics, that is indicated as the most effective.

This swaying, pushing, pulling, combined with a clever use of the thought that "compromise" produces the fairest result makes clear, unbiased thinking exceedingly difficult.

The pressure groups realize that *any* compromise is a victory for them. When they cannot gain their objective by a direct presentation, they will unite with another group on the principle of "you scratch my back and I will scratch yours." Between them they will achieve a "compromise."

The regulations that implement the Code have been the most affected by these activities. Too many restrictions run the cost of construction up and up. Wages are not the only excessive cost in construction.

Restrictions that cannot be justified from the standpoint of safety to life and property and are not needed to make enforcement a practicality are doing their part in making it impossible for a young couple to build their little cottage.

The National Electrical Code has been remarkably free from the effects of such pressure but the pressure continues ever present.

These three influences are therefore at work:

1. An honest endeavor to include those provisions that are necessary in order to eliminate the hazards to life and property:

2. The sincere effort to embody enough regulations to embrace every phase of construction and use; and

3. The desire to include something that will give a particular group an advantage. The Code is the result.

Inspectors Ordinance

First draft submitted to So. Cal. Chapter meeting

First draft of a model ordinance for electrical inspection was presented to the Southern California Chapter, International Association of Electrical Inspectors, at Pasadena Nov. 14 by Kenneth Howard, chairman of the ordinance committee. Jesse K. Ross, San Bernardino city inspector, presided and Paul Shigley, Pasadena electrical inspector, made arrangements for the meeting at the Municipal Golf Course Club House.

From the electrical standpoint, Santa Claus Lane was a great deal more than a dazzling mile of Argyle Ave. in Hollywood. It was a 430-kw. load, involving 12 miles of feeder wire, ten miles of wiring within the artificial trees, and five miles of guy wire. Each of the 100 trees, one of which is here being lifted into place, weighed 1,200 lb., was illuminated with 175 colored bulbs. Decorations and wiring were planned, built and installed by Otto K. Olesen

The entire morning was spent in discussing the various provisions in the first draft and in making minor revisions to it. Further discussions on the ordinance will be taken up later.

Paul Rodet, chief, Electrical Division, Los Angeles, was nominated and elected chairman of the chapter for the new year with H. G. Ufer, Underwriters' Laboratories, Inc., re-elected secretary-treasurer.

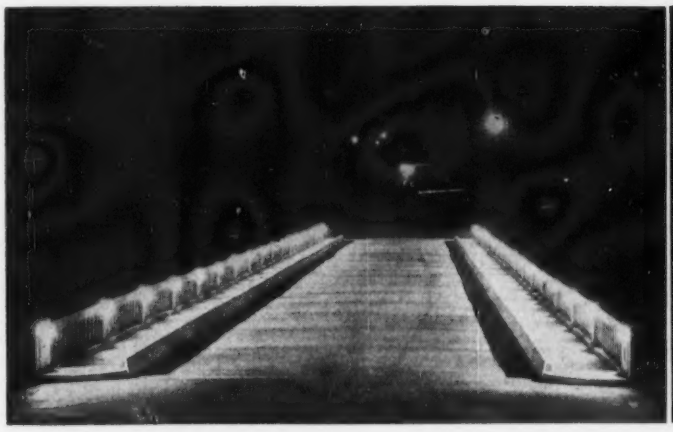
Announcement was made by Thomas Hughes, engineer, Division of Industrial Safety, that all open trolley collector wires for cranes will be required suitably guarded or enclosed. Local inspectors were asked to get in touch with state inspectors wherever any problems arose regarding crane installations.

D. A. Howard, chief engineer, Los Angeles factory, Trumbull Electric Mfg. Co., talked on *Motor Control Centers*. Gene Kruger, Southern California Edison Co., discussed the changeover from 50 to 60 cycles and what it would involve, thus acquainting the inspectors with the situation so that in their contacts with the public they could answer questions intelligently.

It was voted after some discussion of the availability of materials to repeal all emergency ordinances as of Jan. 1, 1946. Los Angeles already had done so and it was felt standard materials were just as available as the emergency materials. Next meeting is to be held in San Bernardino Jan. 30.

Denver Christmas

Unable to wait for new wiring, conduits and incandescent lamps, John Malpiede, Denver's city electrician (urged on by Mayor Ben F. Stapleton and an eager public) managed to corral enough material to illuminate the civic center with a grandeur approximating its prewar lustre. Forty-five thousand lights outlined the mammoth municipal building; pictured Santa in his sleigh, driving reindeer; decorated a mammoth Christmas tree, and electricity chimed Yule carols. Malpiede and his skeleton crew of experienced electricians, supplemented by novices at the highly specialized work, were subjects of civic congratulations Dec. 22 when a master switch flashed on the mammoth display, successfully with most of Denver parked in automobiles, afoot, with bicycles and motorcycles on the adjacent statehouse heights to view the spectacle.



Hand-Rail Lights

Tacoma bridge eliminates visible light sources

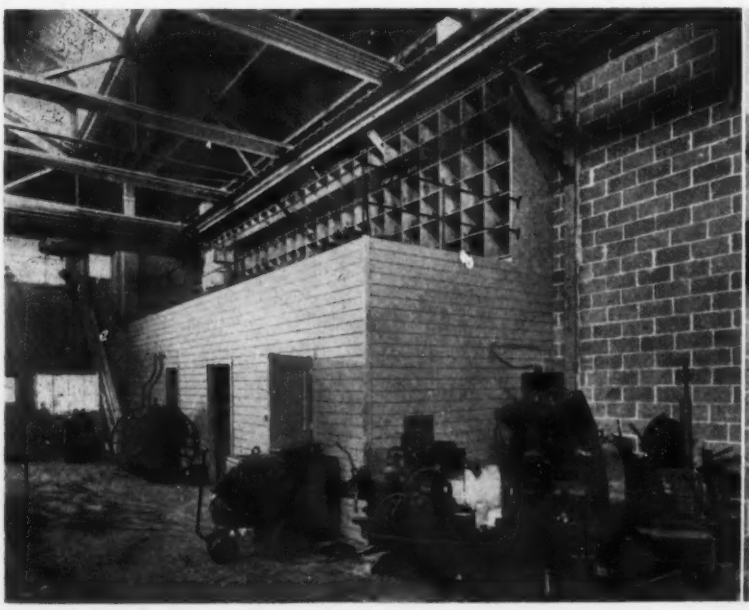
Contrast light pattern and visibility with 3,600 watts of rail lighting at left above, 1,800 watts of it on staggered units, at right, and comparable bridge with 5,400 watts on standards, below; rail lights below driver's line of vision

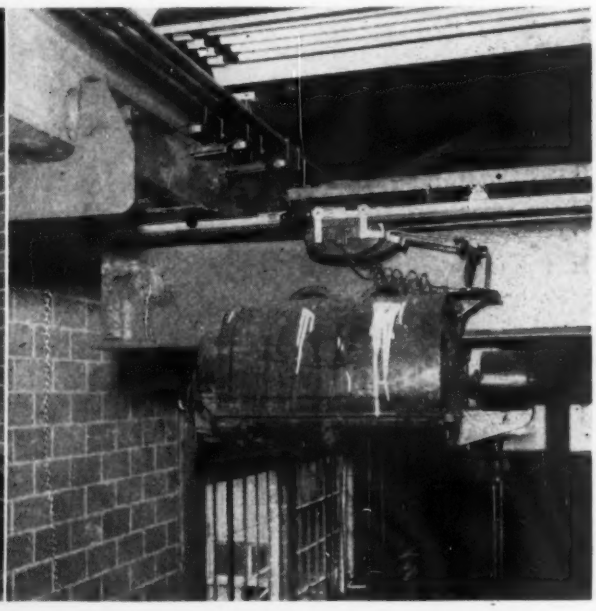
Hand-rail lighting has made its successful appearance on the 30th Street Bridge, in Tacoma. Designed by George Dibert, engineer with the Tacoma City Light Department, the installation has proved to eliminate much of the glare and flash frequently associated with overhead installations.

The 30th Street Bridge is 360 ft. long, 34 ft. wide. The installation consists of 36 units of 100 watts each, which results in 18 fixtures per side, with 20-ft. centers. They are arranged in four 9-light circuits, staggered so that alternate lights are served by the same circuit.

The lighting units themselves are a diamond-shaped metal box, 7¾ in. high, about 15 in. wide, inset about 4 in. into the concrete rail at each pillar. The light appertures, two in each unit, are 4 x 8 in., covered with Tuflex glass, so positioned that the top of the apertures is just at the filament center of the 100-watt lamp centered inside, thus preventing view of the light center by motorists or pedestrians and so eliminating glare. The faces of the unit, at a slight angle from the pillar in which they are set, are removable for relamping only by means of a special socket wrench which fits a special bolt. It was found that with an ordinary concave reflector, lamp heat reflected upon itself built up and shortened lamp life. So a dividing reflector was inserted instead. It is shaped like a V with edges curled in an arc, placed back of the lamp, about 2 in. away. This reflects both heat and light.

At Monarch Iron Works, San Francisco, Arc Electric Co. incorporated latest electrical features. The shop is lighted by parallel rows of cold cathode four-lamp industrial fixtures mounted just above the craneway. With crane trolley wires protected by Benbow Trac-troly, space above tool room can safely be used as additional mezzanine storage





Light on Food

Group exhibit at food merchants convention

An example of a good cooperative exhibit was that placed at the convention of the Oregon Food Merchants Assn., Portland, Ore., Nov. 4 and 5, by the Northwest Electric Light & Power Assn. The exhibit featured the slogan, *Sell with Light.* The cooperation came about through the fact that lighting fixtures and lamps, store design and fixtures, display goods, and wiring and construction services were furnished by eleven firms, while six utility companies operating in the state of Oregon paid for the out-of-pocket cost.

The exhibit was engineered and carried through principally by D. O. Bergey, Northwest Electric Co., and T. W. Fitch, Portland General Electric Co. Not wishing to set themselves up as authorities on store design, these men sought the cooperation of S. Birkenwald & Co., makers of store fixtures in Portland, who designed and made the shelving and fixtures. The utility men then designed the lighting. General Electric Supply Corp. lent the lighting fixtures from those that are to light its new store in Portland, while the lamp department of General Electric Co. and five food stores furnished display goods. W. R. Grasle & Co. did the wiring and L. H. Hoffman Co. the construction of false walls and ceilings, which were placed inside the regular walls and ceiling of the room in the Multnomah Hotel, occupied by the exhibits of the convention.

Since the convention was state-wide, drawing to it independent grocers from all parts of the state, cooperation was sought from the larger electric utility companies rendering electric service in the state, and all joined in underwriting the project. These companies are: The California-Oregon Power Co., Eastern Oregon Light & Power Co., Mountain States Power Co., Northwestern Electric Co., Pacific Power & Light Co., and Portland General Electric Co. To simplify handling of the project through one agency, Northwest Electric Light & Power Assn. was pressed into service as official sponsor, and the exhibit was presented in the name of the Oregon division.

M. S. Glenn, D. O. Bergey, Northwestern; T. W. Fitch, L. J. Collins, PGE

● Revival of the operations of the commercial lighting service department have just been announced by the B. C. Electric Railway at Victoria, B. C. Under wartime conditions, this department has been inactive, but it will now resume its activities in advising commercial organizations on matters concerning interior and exterior lighting. M. I. Hague and Alfred C. F. Evans, both of whom have returned from active service, have been added to the staff of this commercial lighting service division. They will work under William C. Mearns, light and power assistant sales manager.

First school modernization since the war was undertaken in Great Falls by Palmquist Electric Co. C. A. Palmquist (right) with Mrs. Palmquist and his foremen, Herb Kiolet and Ray Hahn, in the Montana store which they managed to keep attractive despite shortages. Emerson school, containing 16 classrooms and auditorium, with only a single 150-watt lamp per room, was rewired for four 300-watt semi-directs per room as well as other facilities. Each room now has two No. 12 circuits and is equipped with convenience outlet. The main switchboard has a 400-amp. switch, feeds are three 500,000-cir. mil. cables and there are six lighting panels instead of one. Most of interior rewiring was done in Wiremold. School was built in 1912 and has had no electrical improvement since. A. V. McIver was the architect.

Lighting Handbook

A lighting design handbook, the most comprehensive and informative of its kind, is being prepared by the Illuminating Engineering Society. It will contain 500 pages of text prepared by authorities in their respective fields in every phase of lighting from pure physics to specific lighting recommendations. Robert W. McKinley, electrical engineer, has been engaged as editor and publication date is October 1946. It will be a convenient manual size, 6x9 in., and sold and distributed through official IES channels. Among the board of consulting editors is L. H. Brown, professor of electrical engineering, Stanford University. Some of the work of the late Robert L. Dearborn will be incorporated in the handbook.

Shoe Grease

Electric heat and control improves production of it

Starting with an operation wherein shoe greases and oils, sold particularly to loggers of the Northwest, were brewed on a wood-burning kitchen stove, Hubers Shoe Grease Co., McMinnville, Ore., has, while expanding its business, progressed to automatic electric heating in the manufacture of its products and enjoyed consequent benefits in economy and safetv.

The necessity for keeping the wattage density of the heating unit low, in order to prevent carbonizing the mixture of waxes and oils that go to make up the product, resulted in the installation of a "double boiler," so to speak. This unit consists of a vat with a liquid-tight false bottom containing Dowtherm, an inert, heat-resisting liquid which acts as the heat exchanging medium.

The Dowtherm is heated by four, three-heat, 7.5-kw., standard Chromolux immersion heating elements, controlled by three thermostats. An elevated tank provides for expansion of the Dowtherm without substantial increase in pressure.

In addition to heating, electricity is employed for automatic operation of the equipment, including electrical drive for agitating the mixture.

Operation has shown that an 800-lb. batch of grease is processed with the consumption of 30 kwh., or only 0.037 kwh. per pound. In addition to the resulting low heating cost, economy is realized by utilizing a timer to start the heating prior to arrival of the crew.

● APPRENTICESHIP in electrical construction in the Los Angeles area has been set up by the State Department of Education through the Frank Wiggins Trade School, and John H. Strickley appointed coordinator. The program is to aid an estimated 150 to 200 apprentices, who will be indentured in the electrical trade in the near future. At a meeting, Sept. 18, representatives from management and labor, comprising a trade advisory committee, set up the program. The trade school has offered courses in commercial radio, electricity for wiremen and in motor winding, PBX extension, PBX preparatory, radio servicing, Morse and automatic telegraphy.

● NATIONAL INDUSTRIAL SERVICE Assn. has announced a third annual cash award contest for ideas similar to its two previous ones. First award of $150, second of $100 and third of $50 will go to employees of NISA members who submit new or improved methods to be employed in motor shops. Entries close March 1, 1946.

● AN INTERNATIONAL LIGHTING Exposition is scheduled in Chicago April 25-30, 1946. By that time it is expected that all the newest developments in lighting equipment will have reached a stage where they can be shown for the first time. It is being sponsored by the National Electrical Manufacturers Assn., Industrial and Commercial Lighting Equipment Section.

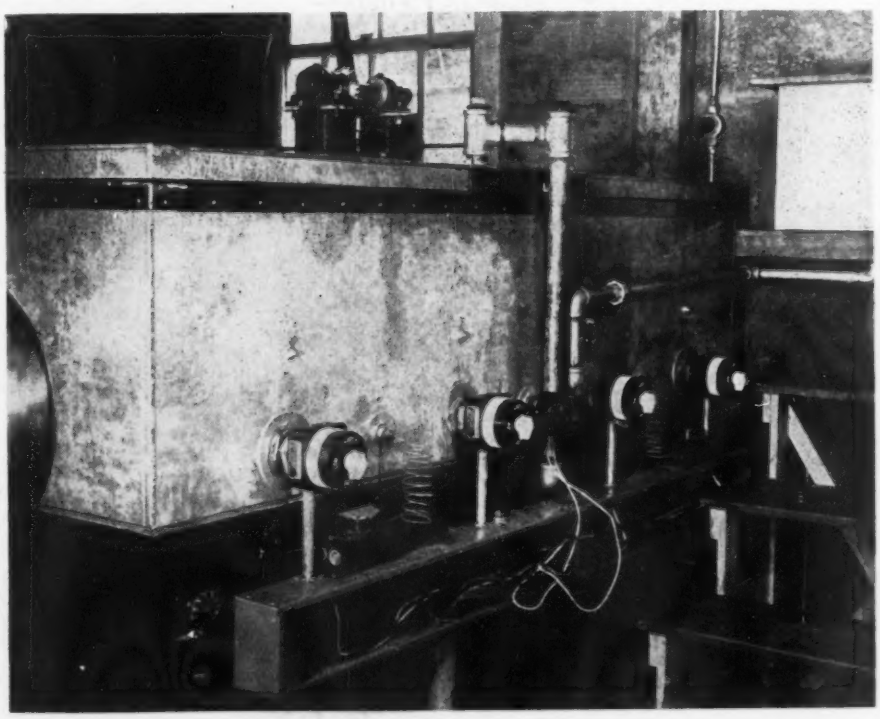
F-Lamp Service

Fluorescent Service & Supply Co., managed by Stanford P. Darger, is a new Salt Lake City company specializing on regular maintenance of lighting equipment. The company works on a plan whereby customers subscribe to a semi-annual service. pav a small fee and are contacted periodically by a repair man who cleans all reflectors, replaces lamps and inspects all component parts of the fixtures.

Besides this maintenance service, Darger is distributor for a complete line of fluorescent fixtures for commercial and domestic use and plans the layout of lighting jobs and makes installations. Darger was formerly associated with Vance Electric Service of Salt Lake City.

● ARMORED CABLE manufacturers have started an educational program with a new motion picture, *The Armored Cable System of Wiring*. The film not only shows the steps in manufacturing armored cable, but will be followed by another picture showing approved methods of installing it. Presentation of the film and technical talks and discussions will be carried on by Henry M. Dreher, electrical engineer for the Armored Conductor and Flexible Metallic Conduit Section of the National Electrical Manufacturers Assn. It may reach the West this year for showings.

Electric heat, automatic timing, thermostatic control and electric drive for agitating mechanism yield maximum efficiency and economy in wax-heating equipment utilized by Oregon shoe grease manufacturer at McMinnville plant



Who

Kensington Elementary School, Kensington Park, Contra Costa County, Calif. Design by P. L. Dragon and C. R. Schmidts, architects, under the direction of J. W. Billings, Lamp Department, General Electric Co. Clyde Bentley, consulting engineer. Installation by Spott Electric Co.

The Need

To provide illumination for a grade school classroom which would meet the recommended practice of lighting California schools for classrooms with low ceilings.

Conditions

The Classroom as a whole measured 23 x 32 ft., but one corner was interrupted by a closet, occupying 5 x 9 ft. Ceiling height was 8 ft. Flat cream color of walls and ceiling yielded a reflection factor in excess of 70%.

Installed

Eleven 300-watt, inside-frost, 120-volt, PS-35 bowl-silvered lamps in Silvray No. 1500, indirect concentric ring luminaires. Mounted with the bottom of the luminaire 14 in. below the ceiling, these were placed on 7-ft. 8-in. centers in rectangular configuration, one being omitted in the area given over to the closet.

Results

An average intensity of 31.2 ft.-candles, as indicated by measurements taken during nine months of use.

LIGHT FOR SCHOOLS

Incandescent

The Need

Suitable illumination for the visual tasks involved in grade school classwork.

Conditions

Typical school room, as illustrated, measuring 23 x 32 ft., with 11-ft. 6-in. ceiling. Walls and ceiling, painted a flat cream, showed a reflection factor in excess of 70%.

Installed

Six 750-watt, inside-frost, 120-volt, PS-35, bowl-silvered lamps in Silvray No. 210 PL/750 indirect luminaries. These were installed on 11-ft. centers (approximate) with the top of the luminaire reflector 36 in. below the ceiling.

Results

An average intensity of 26-ft.-candles, as indicated by measurements taken during nine months of use.

Who

Kensington Elementary School, Kensington Park, Contra Costa County, Calif. Design by P. L. Dragon and C. R. Schmidts, architects, under the direction of J. W. Billings, Lamp Department, General Electric Co. Clyde Bentley, consulting engineer Installation by Spott Electric Co.

Table Top Show

An opportunity was given the sponsoring members, electric suppliers, manufacturers, manufacturers' agents and others to take the spotlight at the Dec. 19 Electrical Maintenance Engineers Assn. of Southern California annual table top exposition. Because many electrical devices and items in the electrical field are still unavailable the number of exhibitors was limited. Each had a card table on which to exhibit whatever equipment, catalogues or data he pleased.

An interesting demonstration of control sequence with the aid of the electric eye was sponsored by General Electric Co. A cold cathode lighting unit was demonstrated by A. B. "Doc" Smedley, agent for Colovolt. A small model of the Multiclone, made by Western Precipitation Co., demonstrated mechanical precipitation. Other items on display were fluorescent lamps, infrared lamps, various insulating materials, control equipment and a display of McGraw-Hill publications. A sound film *Television* by General Electric Co. was presented by Eileen Connelly, of the publicity department. —*Henry Bush*

Mercury Test

An experimental installation of mercury street lighting has been installed in Fresno in front of the civic auditorium. The job consists of four General Electric 400-watt, 16,000-lumen lamps in light alabaster ripple globes mounted on Union Metal standards 25 ft. from the pavement and 90 ft. apart. Lighting intensity on the street and sidewalk under the standards is 4 ft.-candles. The installation was engineered by Thomas M. Catich, city electrician of Fresno. If the quality of light is approved by the city, others may be installed in a general program for relighting Fresno's streets.

Another installation consisting of six units of mercury and incandescent lamps, each providing 28,000 lumens, has been installed on the East Shore Highway at San Francisco Bay near Berkeley at Gilman St. The job was engineered by Al Simmons, of the state highway department.

Dallas Too

Ornamental lighting for Dallas, Ore., will be provided through a contract between the Mountain States Power Co. and the city, which stipulates the shift of all electrical services in the front of business establishments to the rear of the buildings. Construction of the transmission will begin as soon as materials are delivered.

Under terms of the agreement, the new lights will be staggered on opposite sides of the street, and placed five to a block. They will be of the mercury vapor type of 16,000 lumens each, and will extend on arms over the street.

H. K. "Mickey" Winterer, General Electric Co.; C. R. Miller, president, EMEA of Southern California, and A. D. Boardman, industrial control specialist of General Electric, who demonstrated the Thymo-trol at the November meeting. A sound-slide film, explaining this electronic motor reversing device was also shown. Bob Smallman of G-E also assisted

● Washington Water Power Co.'s sales department, at the request of the Junior Chamber of Commerce, has prepared a lighting layout for the city of Spokane's arterial streets. This $36,000 traffic safety lighting program will get under way as soon as approximately 300 lighting fixtures on a five-mile thoroughfare are available. Location of the lights is based on a ten-year report of traffic flow and accidents which show that these mishaps occur on the most heavily traveled streets. Spokane has budgeted $15,000 in 1945 and $21,000 in 1946 to pay for the project.

● Victorians like them rugged. Installation of new 25-ft. street lighting standards on three blocks of Douglas St., Victoria, has been stopped by the city council, which had previously authorized the work, because they felt that the citizens might not accept the slender modern lighting standards as a substitute for the ornamental clusters previously in service. First of the units had actually been installed, but further work has been stopped.

● What's New in Lamps and Lighting has been presented to electrical contractors in a number of meetings throughout northern California by R. E. Lagerstrom, illuminating engineer, General Electric Lamp Department, Oakland. Included were lectures, demonstrations and informal discussions of new lighting sources, certified lighting service and maintenance and the profit possibilities for contractors in the sale and installation of such equipment.

● Electrical Contractors who have done any work for private utilities have been considered poison by several REAs. General protest of this discrimination on the part of a government agency has been made to the Department of Agriculture by the National Electrical Contractors Assn. Among contractors who had such experience are Bennett & Lewis, electrical contractors at Billings and Great Falls, Mont. They reported being refused a contract with an REA on the grounds that they had done work for Montana Power Co.

● Whether general engineering or general building contractors may do work in other than their principal classifications was the subject of a hot meeting of the Contractors State License Board at the State Bldg., Los Angeles, Nov. 24. Proposed rules would have made it possible for such general contractors to make application for a classification other than their own and, upon qualifying, to be issued a supplementary license, but provided that disciplinary proceedings would be brought against them where work was undertaken without such qualification.

They Learned the Latest "Lowdown"

And any dealer can, too, from this full report of what was revealed at the San Diego Bureau of Radio & Electric Appliances conference

NOT just of local interest by any means was the annual fall conference of the Bureau of Radio and Electrical Appliances of San Diego County, Nov. 27, at San Diego. Dealers everywhere in the West, during this jittery time of uncertainties, can derive a great deal of good even from a report of the things discussed there, for they were the same things they themselves would like discussed in their presence. If the opportunity was not theirs, then by proxy there is much that any dealer can benefit by reading.

For the fall conference of this live dealer and distributor bureau was organized to bring them the latest word, the most authoritative that it is possible to get from all sources today. High spot of the program was the session at which representatives of the various factories, in brief and sincere words, gave their frank appraisal of the merchandise stock situation at each of their factories. While few could promise early deliveries of much merchandise, and strikes and threats of strikes made uncertain even the promise of improvement, there was comfort in knowing exactly what can be expected.

Out of this report of the San Diego program, dealers and their sales allies, the distributors and utilities, can see what activities this live-wire bureau engages in to smooth the way for sales, to improve business conditions and practices, and develop the local market.

In organization, the meeting started at 2 p. m. with reports from each of its special activity groups. Then came the manufacturer and product representatives' forum. Following a buffet supper, the evening meeting gave a survey of the bureau's advertising program, heard a report on a consumer survey in San Diego, received advice on business control and sales training, and ended with an inspirational address extolling the opportunities of the community.

Frank Guasti, Parmelee Dohrmann Co., president of the bureau, likened the meeting, in his opening remarks, to the briefing aviators get before starting on a mission. Because the seating capacity was limited by auditorium size, attendance was restricted to 250, and thus only owners, executives and key personnel could be accommodated. It was not yet time, he felt, for a salesmen's meeting.

Without adequate wiring, appliance sales will bog down, J. F. Zweiner, electrical contractor, chairman of the newly formed contractors' division, reminded the dealers. Telling the aims of the contractors division, he touched on the difficulties in obtaining materials and labor now, but pledged cooperation among contractors and between them and the dealers.

How the home planning institutes have prepared 1,600 earnest people

Guasti

who intend to build homes soon to seek adequate wiring, good lighting and modern electric appliances, was told the group by Frank Lockett, manager of the home planning institutes in San Diego County. He outlined the subjects covered and indicated how each one relates itself to either wiring or home appliances. With 20,000 homes estimated to be built in the area as soon as materials become available, the importance thus of preparing those intending to build was evident to all.

With the rapid advances in radio, FM and television, an electronics division of the bureau recently was set in motion. J. Clark Chamberlain, secretary-manager of the bureau, reported for its chairman, Ray Dobler. He announced a forthcoming big meeting of the technical staffs of the radio dealers and radio shops and manufacturers (Dec. 11), at which the details of obtaining surplus electronic and radio equipment would be discussed. This division, like any other of the bureau, Chamberlain emphasized, was for educational purposes. "There are no fences around anything done by any division of the bureau," he asserted, inviting any dealer interested in the technical phases of radio to participate.

A natural follow-up on this was a report from Lou Ferris of the vocational schoól in San Diego, who explained the technical classes now being conducted to train apprentices in radio repairs and to give additional training to old-timers. Two classes of the latter, averaging never less than 35 men, have been taking the course during the past two months. The next phase will be that of training returning veterans, he said, first testing them to see what they really have learned in military training that is useful in civilian radio work. He urged radio dealers to send prospective employees to the school for this one-and-a-half-hour test, which should effectively screen through the capable men.

Wiring again came in for exposition when E. W. Meise, chairman of the wiring committee, merchandising manager of San Diego Gas & Electric Co., spoke briefly of his committee's objectives: 1. to get adequate wiring into the 20,000 postwar homes to be built; 2. to develop a program for rewiring old homes, possibly by means of a "packaged" lavout, first for wartime built houses, then later other older houses, of which there are 45,000. Only 2% are adequately wired. A new booklet, *Home*, is to be distributed by the bureau and the power company, stressing four essentials—plenty of outlets, plenty of circuits, circuit protection, and quality wiring materials and equipment. The stake of everyone in wiring was explained by Meise, particularly the dependence of merchandise sales upon the ability of customers to use appliances conveniently.

Harry Callaway, Thearle Music Co., chairman of the bureau's unique planning committee, probably surprised the manufacturers and wholesalers' representatives by his unexpected compliments. The planning committee, in its penetrating report of last year (See ELECTRICAL WEST, July 1944, p. 60), had asked manufacturers and distributors to study carefully the local market and present dealer coverage before considering the franchising of additional outlets.

"During this time of pressure we have watched the appointing of dealerships," said Callaway. "The bureau is appreciative of the care you have exercised in making these appointments. Some have made fewer appointments than have been recommended by the manufacturer. We are very appreciative of this.

"You are in for the greatest pressure in all of your careers. Even Dun & Bradstreet are being pressured to give good financial reports to applicants for franchises, we hear. Yet you are conscious of the danger and are being cautious. You do not want to read a lot of financial obituaries laid in your laps a few years from now. You appreciate that often the life's stake of a man is being hazarded in this venture and you do not want him to lose this stake.

"Even among us old-timers the temptations are the same. All sorts of forces have been applied to us to make big expansions and to increase costs, despite the shorter discounts that are in the offing. You want us all to be permanent factors in the business and are advising caution."

A. E. "Doc" Holloway, vice-president in charge of sales, San Diego Gas & Electric Co., came to the group with "several problems with which we want your assistance in solving." He announced the company's action that day in ordering a new 50,000-kw. steam generator and improvements to its gas lines to bring more gas to the area. These big investments were being made in the face of drastic curtailment of aircraft production and war production in local factories but, surprisingly, loads seemed to be increasing despite these heavy losses in industrial business. If anything should stop this upward trend, however, the company would be in a serious financial fix to regain load to justify these new projects. Upon dealers and contractors, since the company itself is out of merchandising, would depend this sales job.

Zweiner

The company's sales department will become a sales promotion department, he explained, to do mass selling of the idea, so that dealers and contractors can sell the merchandise which will build load. He then described the reconversion job going on in his organization. Most of the company's efforts in appliance promotion and lighting will be channeled through the bureau. In order to make it effective, he urged the bureau on its part to plan its program as far in advance as possible, because when the dealers, distributors and power company invest from $10,000 to $12,000 in a campaign, it deserves careful, thorough preparation long enough in advance to acquaint all dealers of it and to obtain their active support. He cited the lamp bulb campaign then currently running, saying that while reasonably successful, it could have been much more so for all concerned if planned longer in advance and better prepared for by adequate stocks and follow up.

It will not be the company's intention to finance any customer paper, Holloway declared, because banks are fully prepared to do so. The sales effort of the company will be to do advertising of all kinds; produce booklets; provide home economists for public demonstrations; and have a staff of trained people to assist in commercial, industrial, heating, power and domestic utilization. He announced the department heads who would be in charge of these functions: E. W. Meise, domestic electric and lighting sales; A. I. Benedict, commercial lighting; P. P. Pine, power; G. H. P. Dellman, commercial sales to government; R. J. Phillips, gas sales; Walter Chapman, customer extensions; Hi Dillin, rates; Forrest Raymond, advertising, and Truitt Richardson, investigation of complaints.

Holloway ended by asking full cooperation of the industry and answered two moot questions as to company policy in regard to electric ranges and space heating. While the company will not promote electric cooking and water heating in its gas territory, it will offer no obstacles of any kind, he emphasized, to sales by dealers of these appliances. The company, he averred, is not opposed to it but cannot logically promote it where it already serves gas. Where customers wish electric heating, he assured the group, the company will put no obstacle before them, even though gas is a better load for the company than electricity for house heating in that territory. All he asked was that the job be properly engineered and the customer be told actual operating costs, so that he could make his own decision intelligently.

Surplus electronics and electrical

Callaway

equipment was next discussed from three different aspects by Joe Spain, Packard-Bell Co., Fred Dierdorff of the same company, and Frank P. O'Brien, of RFC. Spain, who had been representative in Washington for the electronic manufacturers of the West during war years, explained how several manufacturers had been appointed as channels through which the surplus electronic equipment at the end of war production might be absorbed by radio manufacturers and repair shops. Dierdorff further explained that this equipment, made by the best manufacturers in the nation, was only usable in a limited way because much was so special that it had little peacetime use. Much of this will find its way into the hands of "hams" with home radio sending stations. What is usable by the manufacturing industry will be sorted out from it and made available to those who can use it, returning something to the country for repayment of war debt.

O'Brien outlined the disposal policies of the various agencies of the government having surplus goods and materials to put back into normal trade channels, and then discussed possible joint use of great war factories by groups of manufacturers making consumer goods.

Joe Spain then paid the San Diego bureau a high compliment for its wartime activities aimed at keeping appliances and radios in repair. He declared one of its advertisements had been used as a model by the War Production Board in Washington to stimulate similar advertising throughout the country.

After a recess came the circus of manufacturers' representatives, with J. Clark Chamberlain as ringmaster. Gathering all the factory men in the first three rows of seats, Chamberlain called upon them at random, asking each to step into the "ring" and in three minutes tell what he could of his company's plans and the availability of merchandise. A stop watch was held on each participant; a warning

light flashed at a half minute before stopping time, and a red light to shut him off. Introducing first the local representatives, some of them gave out with news.

Electrolux Distributor J. I. Case announced the finding of a location in San Diego for his warehouse and display.

Thor's Ross Sims, also with local stock facilities, announced a showing of Thor's Automagic washer in December and samples available now of regular models.

General Electric representative, Archie Marsden, also declared that he would live in San Diego and have a warehouse and branch distribution office there.

Charles Moore, speaking for *Chicago Flexible Shaft Co.*, makers of *Sunbeam* appliances and *Mixmasters*, said that within 120 days his factory would be in full production on all lines. It was already retooled and had gone thtrough a wildcat strike but, barring further strikes or tieups of materials, would soon have merchandise for dealers. Answering the implication of many critics that because of the tax situation some manufacturers were holding back until after Jan. 1, he said that it was not true. Deliveries were being made just as fast as merchandise rolled off the line.

Bart Doris, *Stromberg-Carlson*, asserted that his factory was also reconverted and was making a few sets; it had no labor trouble but was finding it difficult to get materials; would not hold sets being made one day beyond the day that OPA gave its price approval.

Raymond Hahn, *Maytag, West Coast Co.*, declared that enough washers had been delivered for floor samples and more would be coming soon. The recent announcement that Maytag was expanding to new factories and would make an automatic, a home freezer and other appliances, was commented upon by Chamberlain.

For *Westinghouse* radio, Everett Isenhower spoke, saying that first models would be shown Dec. 6-7, and then would follow dealer meetings all over the country. He introduced Norman Theobold, as district radio man and Ben Rodgers as representative in San Diego County.

Conlon, said George Williams, had predicted production of 1,200 units a day, last September, but had only been able to reach 40 units a day in mid-October; 100 units by the end of November, but would soon be able to supply samples to all dealers. However, it would be February before much merchandise could be expected. Conlon will place the major part of its effort on ironers, he said, a significant statement.

Lined up for the quiz about "when" merchandise could be expected were these manufacturers' and distributors' men. They gave the latest lowdown

J. N. Cezan Co., said Mose Katz, is about to build a branch distribution house in San Diego on Harbor Drive, a drawing of which he showed the audience. As *Crosley* distributor, he said the plant had had strikes which were now settled and stated that he hoped to have samples for dealers during December.

Bill Vogel, owner of *Electric Appliance Service Co.*, Los Angeles, returned from a 7,500-mile trip through the country for appliance parts, said the parts distribution would be better immediately. As long as new appliances are being made, he said, there would always be a need for the repair service shop and parts.

Fred Fenton, *Easy Washer*, introduced his associates, A. P. Smith and Bill Kuhn, said his factory was up to 10% of its productive capacity, but would soon be making twice as many units as before the war. He said OPA has approved its prices and deliveries were beginning to be made. The prices would be the same as 1942, both in retail list and in discounts.

U. S. Grant, distributor, told of delivering 200 carloads of gas appliances during the past year and expanding into electric appliances as soon as available. He will handle *Voss* washers, expects samples soon and carries an independent line of home and farm freezers; will have the *Detrola* line of radios.

Incandescent Supply Co., said C. B. Childe, will distribute *Garod* radios, but like all other makes, deliveries will be slow and no price had been established as yet. Lighting fixtures were beginning to come through and some shipments are being made to contractors and dealers. Small appliances, such as *Proctor* and *Universal*, are in production and will soon be supplied in quantity.

Roland Kinney, of *Kinney Bros.*, told of a plane load of *Stewart-Warner* radios arriving to sample dealers. A showing of 12 models was made recently in Los Angeles, followed by one at the company's Fresno branch, and then later at San Diego. Kinney Bros. will soon have a warehouse and service shop in San Diego, with Gene Kerr as manager. Other lines Kinney Bros. will handle include *McAllister* vacuum cleaner and lawn mower, *Elgin* kitchen cabinets, *Jewitt* home freezer, *Dictograph* two-way talking system, *Armstrong* portable ironer, a line of electric ranges, water heaters and laundry equipment, a sewing machine line, *Kenrad* radio tubes, *Arvin* heaters, *Miracle Maid* and other small appliances.

Roy Denne of *Nelson R. Thomas Agency* said his company hoped to be able to deliver stocks of a tank type of vacuum cleaner and a washer in the next two months. It will also have an automatic washer next year. The company handles *Universal's* major appliances and *Sonora* radio.

Toastmaster, said Ken Campbell, will concentrate production on a two-slice toaster. Its production has now reached about the same rate as prewar and samples have been furnished dealers for display and from which to take orders for future delivery. Meanwhile the plant is being enlarged to provide one-third more capacity.

RCA, according to Hal Magg, is under production. It has announced a short line to begin with and will spring additional models as they can be put into production. It will provide FM and some television sets next spring, with a complete line by next winter. Television will have to wait for deliveries of transmitter station equipment, and these cannot be made until September 1946. Los Angeles, he said, would probably be the No. 2 national market for television. There are twice as many applications for licenses as there are channels. San Diego, he said, so far had had no license applications. Records, he said, were becoming a remarkable business, and *RCA-Victor* was expanding from $65,000,000 to $120,000,000 in producing facilities.

Norge, according to Jack Tenney, has had work stoppages, too, but hopes to deliver refrigerators the first quarter of next year (1946), washers also. It has been delivering ranges. A show of the company's entire line of products will be held in Chicago, Jan. 7-17, and then through distributors throughout the field. The company is moving out of Detroit entirely. A new range plant in Effingham, Ill., is already in production. A new washer plant, where automatics also will be made, is being built at Herron, Ill.

Bendix, said F. C. Doyle, has been strike-bound, but its Clyde plant is now able to produce from 400 to 600 units a day. However, other plants producing component parts were still strike-bound.

American Central Kitchens, distributed by *L. J. Meyberg Co.*, has made its first deliveries of kitchen cabinets, said Jack Taylor. Made by a company that converted from Jeep bodies to kitchen cabinets, the line eventually will include a home freezer, an automatic dishwasher and sink with garbage disposal unit, due about May or June.

Eureka, according to R. L. Boyington, is in full production on its cordless iron and home cleaning system and will make garbage disposal, too. Token shipments have been received on the Coast and a full car was expected in Los Angeles in December. Dealers will all soon have samples.

The evening session, following a cafeteria buffet type of dinner served in an adjoining lunch room of the San Diego Gas & Electric Co. service building, began with four more short talks from manufacturers; however, each presented a well qualified viewpoint on a special topic.

E. L. "Cy" Frellson, *General Electric Supply Corp.* and *Hotpoint* distributor, was asked to talk of the sales opportunities in dishwashers and kitchens. Frellson said that before the war the dishwasher was just getting a good start, and that until a million and a half units of any appliance were in use it had not "arrived" yet, and dishwashers were fast nearing that saturation. Surveys have indicated that 60% of the women asked, want a dishwasher, and 20% would buy immediately if they were available. The more companies made them the more they would be advertised and the more sold, he concluded. They are in active manufacture right now, he said.

Ed McCarthy, general sales manager of *Farnsworth*, who made a special trip to attend this meeting, was asked to speak on the radio and price situation. Because radio is in the most viciously competitive market of all, he declared, there is no truth whatever to the claim that manufacturers are holding back until a more favorable tax situation. Each one is racing to get his product to market first. He stands to lose more by being late than through taxes, McCarthy said. Despite this, the prices allowed component parts manufacturers have been insufficient, they think, and manufacture has stopped there. Once shipments really start, he said, stock would come in reasonable quantities.

As to shorter discounts, he declared, OPA considered that much of the prewar discount was fictitious because it was used to cut price or to trade away. But the nature of the business from now on was such that survival of the fittest would require sound business management and low overhead on the part of the dealer. The OPA rulings in regard to small sets, he felt, would

Thompson

act as an automatic barrier to many opportunist new manufacturers who had hoped to flood the market and clean up with two years of profit and then quit. There are 108 licenses already under the patents, and 70 more plan to make sets, he said, so competition will be plentiful.

Leo Hungerford, *Utility Appliance Corp.* (formerly Utility Fan Corp.), spoke of the potential for air conditioning, particularly of the packaged units. He described the full meaning of the term "air conditioning," and then said that it was usually referred to as "comfort" producing. He felt a real bet was being overlooked in not stressing the health angle more, since the public is so eager for things that promise better health. While air conditioning in packaged units might still be far from its first million units, he said, it was something dealers should get into for the long pull.

R. J. McNealy, general sales manager for *Lee DeForest*, was asked to talk of the television prospect for San Diego and southern California. He said the ultimate prospect was good but a number of serious obstacles had to be overcome first. KHJ, in Los Angeles, he said, has pioneered in television and from its experience the difficulties are: 1. Cost of installation; 2. time waiting for delivery of station equipment; 3. programs. In radio a program can be prepared in a maximum of four hours, but in television it takes two weeks to prepare for the same program. 4. Labor unions—there are 22 unions that have to be dealt with.

Presenting the bureau's advertising program currently running, and describing the themes to be followed until merchandise begins to appear in quantity, O. G. Thompson, General Electric Supply Co., chairman of the advertising committee, and Forrest Raymond, advertising manager, San Diego Gas & Electric Co., re-emphasized the mass selling idea which will be implemented through the bureau.

In order to sample public opinion and from such sampling find the sales appeals that will go directly to the public, Raymond explained, a research organization, Knight & Parker, has been engaged to get the information. John Knight of that firm then talked, explaining the techniques used in surveying public opinion. With this as background and to illustrate its soundness, Knight then told of the first project which had been carried out in San Diego. It was to find out what the home wiring situation is.

Not to determine the field for more wiring, but to find out what the *public* itself thought the need to be, was first. According to customers interviewed, a third of the homes need more wiring. That is, a third recognize that they need it; probably many others need more wiring but are not conscious of that need. Second was sought the appeal which aroused the most response. It was found that inconvenience in moving furniture and the need to disconnect existing lamps and appliances in order to use others, made the most impression. Next to be determined was how much *they* thought they should pay, and whether they were willing to pay for more outlets. Most of them thought outlets should not cost more than from $2 to $5, and indicated that, if it could not be done for that, they were willing to pay a reasonable price.

Also learned was whether the public thought electricity expensive. The survey tried to find out what they thought it cost to burn a 100-watt light, as a measure. Although most people were mistaken as to the actual cost, few thought it expensive. A third of those sampled plan lighting improvements and 75% want to use fluorescent light. It was also learned, Knight told the dealers frankly, that the public was not well satisfied with

radio servicing done for them during the war and that it behooved dealers to straighten out public relations in that direction.

The vital importance of keeping strict business control over all costs of doing business in the highly competitive, the more costly to operate and the shorter discount days ahead, was emphasized by William A. Cyr, associate editor, ELECTRICAL WEST. The business office is like the control station and the owner will do well to navigate by "instruments" in the foggy business weather just ahead, he advised. Instruments for business are good bookkeeping and accounting methods and sound policies in buying, selling and operating. He congratulated San Diego dealers on having had prepared for them by the bureau planning committee such a sound guide for dealers to follow.

Selling has degenerated during the years of scarcity, Fred J. Fenton, regional sales manager, *Easy Washing Machine Co.*, told the group. If it is not revitalized, "Minnie Smith may buy another automobile instead of that new appliance you have for sale." Within 60 to 90 days there will be so much merchandise that selling will have to be intense again, he predicted. He advocated: 1. Taking full advantage of the manufacturers' sales training programs; 2. Arranging with representatives of the lines handled to conduct a training program in the dealer's own store; 3. Having sales people learn a demonstration thoroughly; 4. Taking the manufacturer's advice as to the sales story to be presented, and 5. All taking refresher training, no matter how good they were.

On a local and inspirational note the meeting was closed by a stirring talk, extolling the business opportunities of the San Diego area, by Edwood T. Bailey, manager of San Diego's convention and tourist bureau. He, too, said that salesmen had not been selling recently merely dispensing, but that the need for selling was at hand.

It was not an easy thing to take, the almost unanimous opinion that, despite the most eager buying public dealers ever could expect at a holiday season, there would be no electrical merchandise to sell. But being veterans of a struggle for survival during trying war years, the San Diego dealers took it gamely and seemed thankful that at least they had an alert bureau, helpful all through the crisis, and still on the job to assist them over this last hump; too. The bureau is to prepare for those who attended the meetings, and all of its members, a full report of the program and a summary of the meat it contained. Thus those members of the organization who were not able to attend will have a condensed report.

Enlarged lamp section at the Crescent Department store at Spokane. The section was moved recently from the fourth floor, where it adjoined the china department, to the third floor, with the home furnishings It has been incorporated into the store's "Aisle of Ideas" and is near a series of model rooms, which display furniture, drapery, rugs and lamps. According to S. Luther Essick, department manager, this "juxtaposition of related merchandise has been beneficial in increasing interest and sales in all items." As another improvement, the Crescent plans to open up an entire new floor devoted exclusively to electric appliances

Gross Electric Co. of Portland readied itself for tomorrow's wiring and appliance business recently with a modern shop

During the war it was busy in service work for commercial and industrial customers but plans to sell appliances soon

ELECTRICAL WEST
Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © JANUARY, 1946

To Stay Afloat

While waiting for that promised flow of new appliances to start it is a good time to do some thinking about the business end of staying afloat in these still uncertain times. The man who is already operating, selling other things besides appliances, or in the repair service business may not have quite such urgency to appraise his situation as the chap who opened up a new store a month or so ago believing that there would soon be plenty to sell. These are tough days for the latter, for lease, operating and incidental expenses just to keep the doors open are slowly eating away his operating capital.

So to begin with, perhaps it is well to think about **capital,** how much is needed, how it should be divided between **investment** in inventory and how much kept as **working capital,** and why.

U. S. Department of Commerce surveys found that about 900 retailers go out of business every day in this country.

Poor management is the chief cause.

Not enough capital is next.

For beside the two **essentials** to making a success in business: (1) **ability** or **know how,** and (2) **experience** and knowledge of the technical part of the business, **finances, or capital,** is equally important.

It is true, as proved in many extraordinary cases, that a man of exceptional ability can overcome the handicap of insufficient capital, but it requires pretty rugged fighting to make the objective. The casualties, without sufficient capital, are higher. One survey showed that in one area 47% of all new businesses failed in their first year.

After all capital is the logistics of business, it supplies the equipment and feeds the operation until the goal is attained and some returns come in. Times like the present put a big drain on capital. Without merchandise to sell, there is not enough coming in to pay the expenses. So the working capital has to be drawn on rather heavily.

Failure is not necessarily the only result from lack of capital, though. Mediocrity is more often the result. There are far too many businesses which are mediocre, their owners barely earning from them, after paying their bills, as much as a day laborer.

To the man who is just starting, or thinking of starting, without sufficient capital, the most sensible advice is to go to work for some other dealer. To the young returning serviceman this certainly is the best advice, for he can well spend a year or two acquiring the know-how by working for someone else, getting the advantage of **their** experience.

How much capital?—turn the page.

How Much Capital is Needed?

There are various estimates and ways of estimating how much capital a man should have to run a successful appliance business. Of course, there are many "ifs" connected with it and so no rule is absolute and final. Some men will make a success on small initial capital by expert management and high grade salesmanship. However, there are some general rules that long experience has proved.

One is that a man should have as capital at least four times his average monthly gross or total business.

Another is to estimate the yearly business total, figure that two-thirds of it may be tied up in term contracts which are contingent liabilities. This rule suggests that a dealer should have $1 of capital for each $10 of contingent liability. Then if the term contracts average more than a year in length, the amount of capital required should be increased proportionately.

One very clearly stated analysis of this need for capital was recently worked out by the executives and the chief accountant of the Leo J. Meyberg Co., long experienced appliances distributors. With their permission it is quoted here:

"You will need capital. That means you will need not only enough to **start** the business, but enough to **keep** in business after you begin.

"Lack of sufficient capital has caused more people to fail in business than any other factor. We are speaking now more in terms of **operating capital,** money to work with, than we are of initial investments.

"It is relatively easy for any one to **start** in business as an appliance retailer. It is possible to put in a stock of merchandise on credit. No doubt you can buy and install fixtures the same way.

"Yet this is only the beginning.

"You should not be dependent, as a retailer, on the day-to-day receipts from sales for cash with which to meet current expenses. You should begin operations **from the start** with **enough reserve cash** to tide you over the hump. Then from your net income, you should earmark enough money **to maintain** your working capital at a safe **operating level.**

"Too much emphasis cannot be placed upon **sufficient capital** as the first prerequisite for successful appliance retailing."

This company then summarized the estimated requirements in the way of capital for various sizes of appliance and radio retail operations. These are conservative but will give an idea of what capital is needed. The estimates are based on appliance and retail operations to serve trading areas of various sizes of population.

Summary of Estimated Dealer Financial Requirements for Average Dealer in Towns or Trading Areas of Less Than 5,000 Population

Kitchen group	$1,425.00
Laundry group	580.00
Entertainment group	1,575.00
Utility group	600.00
New operation expenses	1,200.00
Displays—signs	200.00
Minimum additional working capital	2,000.00
	$7,580.00

Note: Add store remodeling, if necessary, in each of these estimates. Deduct equipment now owned.

5,000 - 15,000 Population

Kitchen group	$ 2,510.00
Laundry group	850.00
Entertainment group	2,915.00
Utility group	900.00
New operation expenses	1,850.00
Displays—signs	300.00
Minimum additional working capital	3,000.00
	$12,400.00

15,000 - 25,000 Population

Kitchen group	$2,730.00
Laundry group	850.00
Entertainment group	3,885.00
Utility group	1,415.00
New operation expenses	2,900.00
Displays—signs	350.00
Minimum additional working capital	4,000.00
	$16,230.00

Over 25,000 Population

Kitchen group	$ 4,110.00
Laundry group	1,130.00
Entertainment group	5,770.00
Utility group	1,805.00
New operation expenses	3,450.00
Displays—signs	400.00
Minimum additional working capital	5,000.00
	$21,765.00

As further breakdown of these estimates the actual number of appliances in each group and the estimated wholesale cost for the total is given for the 5,000 population summary. The larger population capital summaries will be in proportion in number of appliances that the estimates cover. Naturally, too, adjustments are needed where the dealer does not intend to handle radio or some other group. These, however, are a guide and may be used as such only.

Kitchen group

Refrigerators, 3 models	$ 340.00
Gas ranges, 3 models	250.00
Electric ranges, 2 models	225.00
Dishwasher, 1 model	90.00
Disposal sink, 1 model	110.00
Home freezer, 2 models	120.00
Cabinets, sinks, sample kitchen	200.00
	$1,425.00

Laundry group

Washers, non-automatic, 3 models	$ 155.00
Automatic washers, 2 models	220.00
Dryer, 1 model	80.00
Ironers, 2 models	125.00
	$ 580

Entertainment group

Radio sets, 5 table models	$ 155.00
1 console model	50.00
Phonograph combination, 1 table, 2 console models	175.00
Television receiver, 1 model	140.00
Records and accessories	1,000.00
Radio tubes and parts	100.00
	$1,575.00

Utility group

Vacuum cleaners, 3 models	$ 120.00
Room coolers; 1 model	50.00
Space heaters, electric, gas, oil	120.00
Sewing machines, 2 models	110.00
Table appliances, assorted	200.00
	$ 650.00

New operating expenses

Tools and shop equipment	$ 300.00
Truck	600.00
Office equipment and supplies	100.00
Appliance parts	100.00
Miscellaneous	100.00
	$1,200.00

Specific study of the dealer's own kind of customers and what they will be apt to buy should determine what merchandise to stock. This will be treated in a subsequent Sales Guide.

It can be done for less, but where it is, the proprietor should be realistic and put into the operation more time, more energy, more skill in making sales, more care in little economies.

The Law of Least Inconvenience

First of a series of good sense articles on business management

by Ken Hampton

MAN at best is a lazy being. Most of the things he does are for necessity and he likes to be inconvenienced as little as possible.

Merchants and salesmen should recognize this and use this quality in people to help their businesses grow. **The merchant succeeds best who inconveniences his customers least.** Let's state it as **a law of the least inconvenience** in merchandising. It is the principle that always works. The least a person is inconvenienced, the better he is pleased. It is no accident that 5c articles wrapped and ready for delivery sell easily. They answer two basic requirements:

1. The customer is not spending an unusual amount. He is spending a

unit of money which he regards as of little consequence and which is readily available to him.

2. As a customer, he is inconvenienced least when he can point or reach for an article instead of asking for it. And he can secure immediate possession of it.

This product principle goes through all merchandising transactions. Installment sales built up the durable goods industries into their enormous peaks because it was less inconvenient for customers to pay small monthly amounts than it was to pay large cash payments.

Variety of stock is displayed with the idea that goods can be handled and delivered immediately to customers at small unit prices, again taking full advantage of the least inconvenience to the customer.

Electric appliances, notably the electric refrigerator, gained their great popularity when they met this same law:

1. Being paid for on convenient monthly terms and
2. Being delivered immediately from stock, plugged into the electric circuit and immediately going into customer use.

It is well to realize that electric appliances have been accepted by the public in almost direct proportion to the ease with which they can be:

1. **Easily operated.**
2. **Easily installed.**

This principle works in reverse for the merchant. The merchant's own greatest convenience of course comes from making for him and his salesmen as large an income as possible with the least possible inconvenience to himself. He does this easiest when he makes things most convenient, or least inconvenient, shall we say, for his customers. So as a merchant and a salesman, his problem becomes easier when he gives quick, efficient customer-pleasing service.

Merchandising is man's greatest expression of self-confidence. It stands as a tribute to his ability to reach beyond his immediate surroundings profitably.

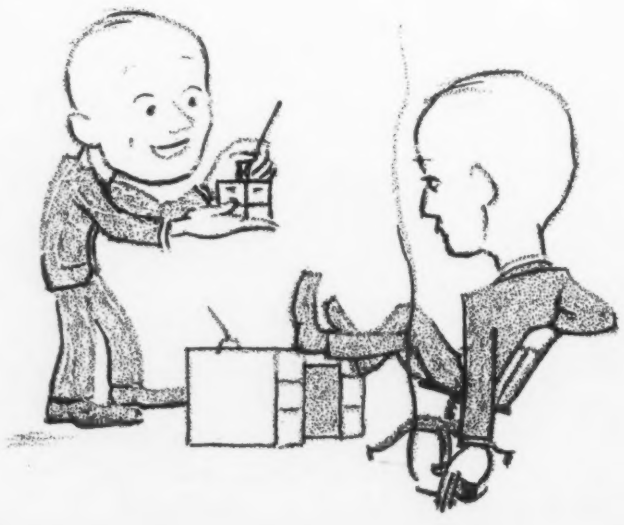
I have always challenged the belief that trade started through necessity. It seems to me that trade came about because men wanted more goods than their immediate surroundings offered them. Generally these additional goods they wanted were luxuries designed to please their pride or adorn their families.

Witness if you will the tremendous fight over trade routes to the east which led to Columbus discovering America, a fight primarily for condiments, spices and perfumes that the East offered and which, after all, didn't make the European any better looking, although it may have made him smell better.

Merchandising is the modern expression of this trading. It is the merchant's expression of his belief in his **ability to buy goods which will so please the people in his community that they will pay him amply for his time and expense** in buying these goods and offering them for sale.

Today we have tremendous emphasis placed upon salesmanship. True it is probably the greatest single factor affecting our lives. Because of it our merchant can stay in his store and buy better than he could when as a merchant prince he had his own ships sailing the seven seas. The fact that he can sit in his store and do such buying makes it doubly necessary that he shall **buy soundly for the needs of his community** because just down the street is a competitor who also sits in his store and buys.

The fight today is not so much in the merchant's ability to go to the market where the goods are offered as it is for him to please the producer well enough so he will come to the merchant's store first with his best offerings. Then when he has bought, his test of showmanship comes.



Balanced Meals

Edison girls teach what and how to prepare them

CARRYING a message of the necessity for well-balanced meals, properly prepared, the home economists of Southern California Edison Co. are addressing the home economics classes of the schools throughout the company territory, according to H. C. Rice, merchandise manager. It is a follow-up of the wartime nutrition classes, the breakfast program carried on in behalf of war workers and similar war service educational work.

The company's two home economists, Mrs. Theia Kamerer and Mrs. Evelyn Conant, call on the 150 high schools in the company's service territory and present a well-developed program and cooking demonstration. An electric roaster and a Mixmaster are also carried along to prepare the food.

A special visualizer has been developed to assist the story. In order to be applicable to various levels or grades in high and elementary schools, it was developed to demonstrate, dramatize and finally clinch by taste, the lesson it brings. The visualizer, made of lightweight materials, is a simple case that opens like a book. On one side are racks on which to place lettered signs indicating the basic items of the balance diet. On the other, a circle represents a dinner plate on which pictures of the various foods or acceptable substitutes can be placed, then the movable hand pointer can be moved to indicate the percentage of the total meal that item represents. If a certain item of diet is not liked, others with equal nutriment are substituted.

The home economist emphasizes that a balanced meal includes a meat or meat substitute, vegetables or fruit, bread or muffins, butter or fortified margarine and a half pint of whole milk. Each rates 20 points on the scale. After seeing the device, pupils are asked to make up what they think is a balanced menu, and the pointer is advanced at each selection. The score must reach 100 if a balanced meal is provided.

It is not enough to plan healthful meals, the home economist continues, they must be healthfully cooked. There is destructive cooking as well as protective cooking. The electric way, with measured heat, which makes possible cooking with little water, is then demonstrated in the roaster which, it is explained, is a miniature electric range oven. Final proof is the taste of the muffins cooked in it during the demonstration.

The entire presentation is designed to fit within an average school period of 40 or 45 minutes.

● CONSTRUCTION has been started by the *Dennstedt Co.* of San Diego on what is expected to be one of the region's largest retail appliance stores, the *Dennstedt Electro Mart*. The new building, located at 41st St. and El Cajon Blvd., will cost $60,000 and contains 10,000 sq. ft. of display area. The two-story building will display many leading lines of electrical home equipment, and will also have a record department, a model kitchen, and a model laundry. Manager of the store will be *Ervin L. Teeter,* who has had a wide background of appliance merchandising in the midwest.

● TED THOMAS has purchased the *Roy Davis Radio Co.* and is now operating under the name of *Electronic Equipment Distributors*, 1228 Second Ave., San Diego. Assisting Thomas are *Warren Holcomb, Bill Woodbury* and *Ralph Rogers.* The organization carries a complete line of all standard parts for dealers. An outstanding feature of Thomas's operation will be a "ham shack," entirely separate from the store, and operated exclusively for amateur radio fans. Complete lines for "ham" users will be stocked, and the shack will boast a study room and lounge equipped with an up-to-date radio library and workbench.

Tells How

A. H. Wegner, general commercial manager of the Washington Water Power Co., recently released a booklet titled, *How you can get electricity to your rural home.*

Printed in two colors, this pamphlet is meant for limited distribution to aid the farmer in obtaining and using electricity. It covers such topics as how electricity reaches your home; how the prospective customer can go about getting service; the cost of building a line; Washington Water Power's low rates; adequate wiring; how to read the meter; the cost of using various appliances; essentials in an all-electric home, and simple instructions on customer relations.

Wegner comments that there has long been a need for such a booklet, and that it will help to answer the many questions that come in from the rural area. "With added emphasis given to electric service during the war," he says, "the farmer promises to be one of the most important markets. And certainly the Washington Water Power Co. has one of the finest stories to tell regarding rural electrification. Already the booklet has brought good comment."

Usual set-up for home economics class presentation, with range, roaster and display kit on the table is shown at left, with Mrs. Evelyn Conant, Edison home economist. In center, Mrs. Theia Kamerer is shown carrying the compact display kit. At right, the kit opened up, with the removable cards all in place. The dial at right has a pointer which is moved to indicate percentage of the totally balanced meal represented by food placed inside circle

ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO, 4

The all-industry magazine of progress, established 1887 and incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity." Contents Copyrighted.

EXECUTIVE AND EDITORIAL STAFF

James H. McGraw, Chairman of the Board
George C. Tenney, President and Editor
W. A. Cyr, Associate Editor
Wayne Snowden, Engineering Editor
Peggy Boyer, Assistant Editor
R. A. Balzari, Publishing Counselor
Roy N. Phelan, Manager
John Cootz, Typography

MEMBER AUDIT BUREAU OF CIRCULATIONS

ADVERTISING REPRESENTATIVES

Ralph H. Flynn, 330 W. 42nd St., New York 18
William B. Heaps, 520 N. Michigan Ave., Chicago 11
Roy N. Phelan { 68 Post St., San Francisco 4, DO 4600 / 621 S. Hope St., Los Angeles 14, MI 3873
Stephen H. Babcock, 2980 Penobscot Bldg., Detroit 26

EDITORIAL ADVISORY BOARD

UTILITIES: R. E. Fisher, Vice-President in Charge of Public Relations and Sales, Pacific Gas and Electric Company, San Francisco; J. A. Hale, Vice-President, Utah Power & Light Company, Salt Lake City; Glenn L. Jackson, Vice-President and Commercial Manager, The California Oregon Power Company, Medford (in military service); Frank McLaughlin, President, Puget Sound Power & Light Co., Seattle; L. T. Merwin, President, Northwestern Electric Company, Portland; W. C. Mullendore, President, Southern California Edison Company Ltd., Los Angeles . . . MANUFACTURERS: J. H. Pengilly, Executive Vice-President, Square D Company, Los Angeles (in military service); C. A. Dostal, Vice-President, Westinghouse Electric Corporation; A. S. Moody, Northwest Manager, General Electric Company, Portland . . . WHOLESALERS: J. I. Colwell, Northwest Manager, Graybar Electric Co., Inc., Seattle; N. W. Graham, Graham-Reynolds Electric Co., Los Angeles . . . CONTRACTORS: Lloyd Flatland, Globe Electric Works, San Francisco; S. G. Hepler, Arrow Electric Co., Seattle . . . DEALERS: H. H. Courtright, President, Valley Electrical Supply Company, Fresno; J. C. Chamberlain, Sec'y-Mgr., Bureau of Radio and Electrical Appliances, San Diego, California

Award for Cooperation

AWARD of the James H. McGraw Medal for Cooperation to David E. Harris has particular significance to the electrical industry in the Far West. It once again emphasizes the degree to which this region has developed intra-industry cooperation. Also it gives recognition to a phase of cooperation which heretofore has not received attention.

The 1945 award is the fifth to be accorded to a Westerner. This is a distinction no other region of the country has achieved. And in each instance the award recognized a distinct and new contribution to the history of cooperative activities in the electrical industry. H. H. Courtright received it for his radically new "through-the-dealer" plan of merchandising. C. T. Hutchinson was accorded posthumous recognition for developing industry coordination. G. B. Buck was acclaimed for organizing the "Rocky Mountain" market development program. R. E. Fisher won the award for coordinating and promoting market development.

The recognition accorded Dave Harris, however, differs radically from all of these. In the opinion of the judges, he merited the award for having devoted his entire active business life to building cooperation between the various groups in the electrical industry. As the citation says, he has lived a "life of cooperation in the belief that the different interests that make up this industry are interdependent and that the bounties of good to one are shared by all." Few men in the industry have so many friends as Dave Harris. We join with them in congratulating him for the recognition accorded to him and, through him, to the entire electrical industry of the Far West.

1946—Perplexing and Complex

WITH the return of peace to most of the World, the eyes of Americans are turned to the homefront as 1946 dawns. Most of them are wondering if 1946's postwar plans and performance will live up to wartime's hopes and promises. Certainly a lot of early optimism has given way to a reasonable degree of doubt. The labor pains of reconversion are worse than anticipated, and the resultant dissention and discord is testing the people's tempers.

The new year begins with little alleviation of the paucities and scarcities that were intensified as the war continued. A lot of bottlenecks are tighter now than they were a year or more ago. Housing is an example. Clothing, textiles, appliances, automobiles and radios still are not on the market in any quantity, while customer demand continues to mount. Adequate supplies will not be available for a year or more in the case of some of these items.

An interesting paradox is the over-all public complacency and optimism in the face of these stringencies. Perhaps it comes from the war-created habit of submitting to all kinds of restrictions and of queueing up for almost every necessity. The optimism seems based upon a general misconception that both security and prosperity can be obtained without work. The number of people who would willingly sacrifice liberty for security is astounding. Some experts predict a rude awakening for these misguided folk in 1946, but it is doubtful.

Since the inception of the atomic age, when Hiroshima was blasted to rubble, there has been a growing fear of the ultimate control and possible misuse of the atomic bomb. Perhaps 1946 will bring a solution to this problem. The announcement that its control would be placed in the hands of an international commission stirs hope that the scientists' predictions of beneficial use of this momentous discovery may develop quickly.

Many of these complexities vitally affect the electrical industry. The labor problem does. So too do the scarcities in many articles. Developments in the application of atomic energy do. And the industry will be affected by the political and economic leanings of the public. However, none of the difficulties are so great that they cannot be overcome. As a matter of fact, the industry has a record of performing at its best when the going is tough.

Labor unrest — undoubtedly a product of the war — is a serious threat to progress and prosperity in 1946. Irrespective of the issues, we have one sincere hope, namely that there will be less talk of rights and privileges and more concern over responsibilities and obligations. Both parties to the arguments, and for that matter the umpires also, might consider this admonition.

Coming—500-Kv. Transmission

PACIFIC Coast transmission engineers will be interested in the announcement that a 500,000-volt test line is to be erected in the Middle West as a cooperative undertaking by American Gas and Electric affiliated utilities and a group of manufacturers. Up to the present time, most of the high-tension transmission development and research has centered in the Far West, where voltages up to 287 kv. have been pioneered.

Thorough studies are to be made of the important factors that control the economic application of voltages in excess of today's upper limits. Investigations will include corona losses, radio interference and insulation coordination at voltages ranging from 264 to 500 kv. The tests and studies are expected to provide essential data for the design of transmission lines and terminal equipment for the economic transmission of large blocks of power at these high voltages in the very near future. Various types and sizes of conductors will be employed, with tests made under varying conditions of weather, spacing and insulator string length.

These studies will be watched with extreme interest by Western engineers, since this region still offers the greatest possibilities for the economical transmission of large blocks of power over long distances.

Lack of Appliances Hurts

SCARCITY of appliances at Christmas cost many a dealer his existence and his stake saved up to start up in business. The actual demise may be delayed some months but the blow was one that really rocked many on their financial pins.

No use crying now, or trying to fix blame. The causes were numerous and very complex. Lack of some tiny part, whether from strike or OPA price or scarcity of important ingredients, was enough to stop the entire flow of an appliance. Perhaps too many dealers, distributors and agents leaped into business too early, before there was anything to sell. The results are the same. Costs of doing *no* business are higher than those of *doing* business. They eat up capital that it will take profit from a lot of sales to replace.

But the worst effect was upon the buying public. There were instances where advertising inferred or even stated specifically that appliances would be available. Optimistic sales merchandising managers may have been honest in their belief that supplies would be ready. However, a resentful public will not forget or forgive.

There were some cases where labor was culpable. Here again the public, if it learns the facts, will be quick to show its resentment. Fact is that public opinion can shift overnight and, if it does, the cause of labor will certainly suffer.

It is to be hoped that labor, which has so much at stake in reaping fruits from the crops of intensive distribution, does not starve, with strikes, the dealers they all will need to make volume of production and hence employment and wages.

THE rapid turn toward government ownership is alarming to us. In fact, just as alarming as it would be to the newspaper fraternity if government-financed and subsidized authorities were staking claim to 20 per cent of the Fourth Estate and were measuring boundaries with a yardstick of their own accounting. Federal Power Authorities have coined the term "yardstick" and have alloyed it with grants, appropriations and subsidies, all gilded with a frosting of beneficence and grandeur to make it alluring to the man on the street. It has been effective. Your business has not known yardstick competition. You have not known the effects of an authority newspaper quartered in an edifice of impressive massiveness, selling advertising at rates below cost, charging a dollar for a year's subscription, employing top-flight writers, buying the best news services, making deliveries by franked mail and giving six sections of comics on Sunday . . . and all because, they say, the people of your community are entitled to that kind of service. We believe if you were confronted with yardstick competition (and may you never be) that you, too, would look for the bugs under the chip and would devote your columns to facts and figures in an effort to remove the gilt from the coin . . . or, at least, you would attempt to get your competition and yourself governed by the same set of rules. And that is all we ask . . . THE SAME SET OF RULES. We welcome any competition we can meet under Marquis of Queensbury rules but we do not believe we should be required to wear pillow gloves into the ring when the chap in the other corner is permitted to harbor a horseshoe. — George A. Davis, president, Oklahoma Gas and Electric Co.

PCEA Awakens Dormant Opportunities

First joint meeting of north and south groups at Fresno plunges into business building, engineering expansion, personnel trends

SURGING like water, long held in check, let loose again, the members of Pacific Coast Electrical Assn. filled Fresno's hotels to overflowing and the meeting rooms of the Californian to capacity in the first joint north and south gathering since the war, Dec. 7-8. Registration totaled 362 and 389 were at the luncheon Friday noon, when L. M. Klauber, general manager, San Diego Gas & Electric Co., explained the atomic age which has come upon the world since the last such meeting.

President Kenneth M. Ryals, Stone-Ryals Electric Co., San Francisco, reminded the group that "Four years ago today we were launched into the most destructive war this world has ever seen. I am glad that we meet again today to begin the reconstruction of our world, to build it into a better world for the future."

President Ryals' brevity was in keeping with the directness with which the problems of reconversion were tackled by the various groups, committees and sections of the association. The only joint session was the luncheon Friday noon. Only two of the committees of the Administrative Services Section, personnel and industrial relations and customer relations, met at this conference, finding much to concern them respecting the return of service men and the readjustment of personnel to peacetime conditions. The Operating Economics Section, after a joint meeting Friday, broke into seven separate groups to discuss specific parts of their operating techniques. The Business Development Section carried through a full program to sweep the entire field of commercial and business development from its skeleton, wiring, to the more extrovert phases, sales training and store modernization.

With a genius for simplifying abstruse subjects, L. M. Klauber, who began by saying "Any resemblance to Admiral King and General Marshall is purely coincidental," presented a prospective of the new atomic age which is beginning to overlap both the electric age and the mechanical age, neither of which has reached its peak. He covered the military aspects, explained simply the phenomena of atom fision and, with apt illustrations, compared the amount of energy available through the release of atomic energy as compared to chemical or mechanical energy from the same substances.

Peacetime applications of these forces eventually can be as important as wartime uses, he declared, but would take longer to be developed because in peacetime it is not practical to draft the scientists, the money, materials and men that it is during war. First applications, he predicted, would

Klauber Ryals

be those in which heat or power is required in large quantities. Atomic power plants will be something like hydro plants, in which the fixed costs are high but the operating costs relatively low. Their one advantage over hydro will be the possibility of locating plants nearer to centers of load.

Only large plants at present can be visualized, he said, because of the nuisance of radio activity. Protection against this radio activity is relatively complex and bulky.

Developments of peacetime uses will be inhibited if the need for secrecy continues, for only by working freely, with an exchange of information among scientists, can progress be made rapidly. He visualized some of the big applications that might be made, such as heating and cooling of entire cities, clearing of ice from channels, applications in the chemical and fertilizer industries.

What course the nation should pursue, he next discussed. That of secrecy, he felt, was shortsighted. The secret cannot long be kept, for research cannot be controlled. Neither can atomic energy be outlawed. World unity and control with inspection seems the only course. The world is at a crossroads of two impossibilities and the people must pick the right one for, he concluded, "in the next war if they're *alive* they'll know there's a war on."

Business Development

H. C. Rice, chairman
Southern California Edison Co.
Los Angeles

B. W. Reynolds, vice-chairman
General Electric Supply
San Francisco

WIRING and its influence upon future selling dominated the morning session of the Business Development Section Friday, presided over by H. C. Rice, chairman, Southern California Edison. Vice-chairman B. W. Reynolds, General Electric Supply, San Francisco, was not able to be present. The morning session was directed by K. L. Hampton, Valley Electrical Supply Co. E. W. Meise, San Diego Gas & Electric Co., handled the afternoon session.

With a rise in range installation costs from $45 to $125 because of higher labor costs and relatively few installations, the prospect of developing much range, water heater or air heater business under such conditions has concerned the range and water heater wiring committee, headed by M. G. Sues, Sues-Young Co., Los Angeles, whose report was made by Rice. The difficulties of arriving at a standard wiring method and price were related, where 85 political subdivisions each have different ordinances.

J. A. Hill, PG and E, declared that, in northern California, efforts are being made to coordinate labor, contractors, dealers, suppliers, inspectors and all interested, and that each needed to give a little. Subsidizing of wiring only holds up its price, he said, and the time has come when the public must pay for wiring of ranges. If the price is acceptable, they will buy it and not complain. If it is unacceptable, the range business will take a nose dive.

By taking advantage of changes in the National Electrical Code, such as use of synthetic coated wires, utilizing up to 50% fill in the conduit, use of a 50-amp. circuit for a fixed range and water heater on the same circuit, some economies in materials may result. Instead of spreading range wiring over too many contractors who

cannot specialize, work is being done with contractor groups to allocate the range wiring to one or two contractors in each community who can specialize and produce methods which use less expensive time.

Albert Kramer, Westinghouse, chairman of the adequate wiring committee, prefaced the showing for the first time of a new Westinghouse color movie on home wiring produced by Disney, with a review of the committee's activities to develop certified standards and to make home modernizing standards for the rewiring of Title-6 war-built homes.

To get viewpoints from others, a panel interview on adequate wiring was conducted by W. A. Cyr, ELECTRICAL WEST. On the panel were W. R. Hagedohm, architect, Los Angeles; R. A. Peterson, vice-president, Bank of America; D. C. Wheeler, contractor-builder of Fresno; A. S. Henderson, electrical contractor, Fresno; G. F. Wismer, electrical inspector, Santa Monica.

What the moderator endeavored to learn from the panel was whether the industry's long campaign to inform the public about adequate wiring had made any impression upon them and the public. These spokesmen for their own group said that it had. They felt certification to be a good idea. However, Peterson, the banker, doubted whether earmarking of funds for wiring would be a practical thing to attempt at the time a loan is made. Hagedohm, the architect, suggested that all home wiring plans should have circuit diagrams approved by inspectors. He was also concerned about the rising cost of building a home, saying it had risen from $4 per square foot to $8 or $9 and that this made building costs so high that the average citizen could not afford a home, if the age-old recommendation that the cost of a home should not exceed two and a half times the yearly income was to be maintained. Builder Wheeler likewise was concerned over rising costs and said the degree of electrification, like the degree of any other facility in a house, would depend upon the ability of the public to buy it.

Highway Lighting Committee Chairman I. W. Borda, Okanite Co., turned over to George Rankin, Southern California Edison Co., a job of making a report of the technical sub-committee, prepared by G. H. P. Dellmann, San Diego Gas & Electric Co., who was not able to be present. A moving picture film on street lighting safety was shown. Dellmann's report indicated that postwar street and highway lighting would require more systems, higher intensities at higher mounting heights, better spacing and more efficient lighting units.

In it he reviewed the economy of good street and highway lighting compared to the high cost of deaths and accidents, described the types of lighting available and the principles required for street lighting as compared to suburban lighting. In the former, lighting is needed for discernment, whereas for the latter silhouette lighting would provide safety for pedestrians and vehicles.

The Code and Ordinance Committee report, scheduled for the morning, was given in the afternoon in the absence of M. G. Sues, chairman, by Victor Hartley, managing director of PCEA. He reported the Unsafe Electric Appliance Ordinance as having been adopted by 84 cities and one county and told of work to bring the Uniform Electrical Code up to date with the 1946 National Electrical Code and to make it adaptable for county ordinances. Study of the unsafe appliance ordinance for state adoption is also being undertaken.

J. A. Hill of PG and E was then asked to report as a representative from the association to the Electrical Committee, NFPA, meeting in Chicago, at which he was appointed an alternate in the light and power group. He described how the Electrical Committee worked, the various groups represented and their viewpoints, and then briefly summarized some of the changes made in the National Electrical Code (see ELECTRICAL WEST November 1945, p. 90). He also urged that, in future appointments of representatives on the Electrical Committee from the Coast, the cooperative type of men from the West be selected.

Prof. H. B. Walker, University of California, next gave his talk, *Outlook for Farm Electrification in California,* which is published in full in this issue, page 53.

Reviewing the status of industrial conversion, G. N. Hawley, Southern California Edison, questioned President Truman's statement that industrial conversion was 90% accomplished. "I can't take issue with the President," said Hawley, "but I can raise the question: Conversion for what? Surely not for peacetime normal production." The paradox of 1945, he declared, was the apparent high level of industrial activity with the low level of finished products.

The situation is not one of simple engineering, Hawley, indicated, because of the many outside influences intruding into the simple engineering reconversion. Government policy and politics, as well as sociological conditions all affect it, labor unrest in particular. The allowances for postwar reserves, it is being found, have been dissipated by renegotiations, contract termination and labor shutdowns. The solidarity of industrial leaders which helped win the war has been let down. Disposal of government plant and surplus has taken longer than expected and much floorspace is unusuable because government-owned machines have not been removed.

On the sales side, price controls are diverting effort from manufacture of previous articles which cannot be made profitably under set ceilings to making "high priced junk" which is on the market instead. Labor strife is not merely political, it has sociological reasons back of it which give support to the objectives of labor leaders. Another disquieting situation is the lack of small processors for many of the basic materials which are available, the small manufacturers being the backbone of a healthy community economy.

A "refresher" on the need for resumption of sales training was given to the section by Willis M. Kenealy, California State Department of Education. Reminding that "there has to be an incentive to buy before a sale; salesmanship is to create that incentive,"

Rankin Walsh Benedict Meise Walker Hawley

Kenealy also observed that output without income meant business suicide, and that the national income grows on salesmen's order books, not on trees.

Three periods were predicted by Kenealy, the immediate reconversion period when merchandise is lacking, the catch-up period when stocks are filled and sales from pent-up demand will be brisk, and then the third, when surplus catches up with demand and energetic selling must be done. Preparation for that third period, he urged, should be made now for there is no shortcut to developing a hard-hitting sales force. It requires research, recruiting, interviewing, training.

He then reviewed the various training facilities available to dealers and sales organizations, including the distributive education branch of the State Board of Education. Use of manufacturer training material, moving pictures, sales training helps, he also described. A Westinghouse Lamp Division film on home lighting was shown as an illustration of such effective sales material.

Frank Cox, until recently himself with the State Department of Education, but now with Kawneer Corp., described the Business Planning Institutes, outgrowth of the Home Planning Institutes, to bring knowledge of modern store design and operation to store operators in various cities. (See ELECTRICAL WEST, September 1945, p. 110). Cox has just covered a number of other Western states in the interest of establishing similar institutes and reported that in Utah a state-wide organization has started. In Montana the same, and the work was beginning in Oregon and Washington. California, he said, will have 50 such institutes running, beginning after the first of the year.

Gas and light shared the Saturday morning program. Liquid petroleum gas in particular, and gaseous fluorescent light specifically. D. B. Wheelock, California Electric Power Co., unable to be there, was chairman by proxy through William Fleming, of the same company.

J. P. McElroy, PG and E, Fresno, told of the spectacular growth of liquid petroleum gas usage during the war, even during the last year making a 23% gain in domestic use over 1943. Sketching the statistics of that growth, McElroy described its spread from a market beyond the end of the utility lines, into all fields of utility customers. Butane, for instance, is invading domestic and rural markets for household appliances and the agricultural and industrial markets for gas engine power.

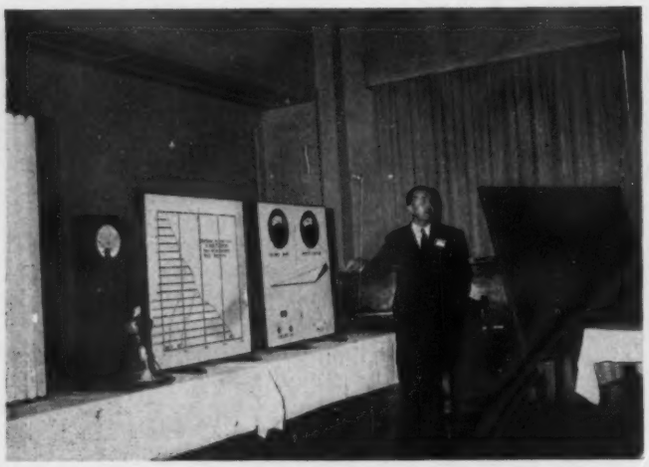
Listing the things that might be done to meet such competition, McElroy discouraged subsidies as being but temporary and usually having a boomerang after effect. He urged simplification of rates, with one rate for all purposes. Most of all he felt the electrical industry needed to study the entire subject and prepare to compete on a basis of superior service.

Fluorescent lighting was treated from the aspect of power factor correction at the concluding portion of the conference. In the absence of George Tenney, ELECTRICAL WEST, W. A. Cyr acted as chairman, reading first letters from Underwriters' Laboratories which questioned whether power factor corrected ballasts could be required of lighting fixtures for UL labeling in as much as there was very little justification from a strictly safety angle.

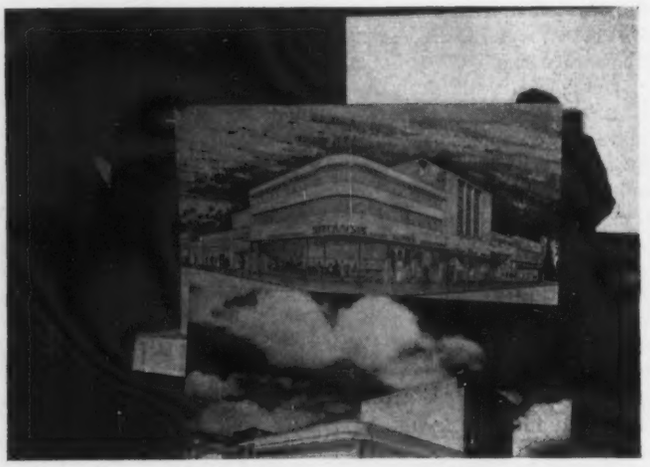
A. B. Smedley, consultant, introduced his graphically illustrated talk on power factor by the showing first of a General Electric sound-slide film on that subject. Then, after showing what poor power factor did to a circuit, claimed there was a safety aspect in old wiring where circuit-breaker protection is relatively rare. By means of meters he showed the amperage drawn by corrected fluorescent as compared to non-corrected, the latter blowing 30 amp. fuses. When blown, Smedley contended, customers are likely to jumper the fuse and operate wiring at dangerous over capacity.

Since Underwriters' Laboratories cannot require power factor correction, the various certification programs in the lighting industry can. W. E. Beemer, Electrical Testing Laboratories, gave a paper describing the tests made by his company to provide certification service. Certification will be given to four classes of lighting equipment under four programs: RLM and Fleur-O-Lier for industrial and commercial, and Certified Lamp Makers and American Home Lighting Institute for floor and table lamps and home lighting fixtures. The IES has decided not to certify, only to establish standards.

Jack Hammond, PG and E, Fresno, conducted an informal forum to end the session, calling first on A. I. Benedict, San Diego Gas & Electric Co., and John Walsh, PG and E, both of whom has recently returned from trips East, to give their impressions and observations about forthcoming lighting equipment, lamps, and lighting ideas. Both found manufacturers still in reconversion, their ideas not yet developed to a point of definiteness. Extensive use of reflector spots and floods of window lighting, also in combination with fluorescent ceiling fixtures for store interiors, was noted by Benedict. Walsh made note of fluorescent troubles from over-heating of ballasts; heard from the Fluorescent Lighting Assn., a group of cold cathode manufacturers, of standardization on 25-mm. tubing; a trend away from recessed fixtures to some permitting spill light on the ceiling.



"Doc" A. B. Smedley teaches power factor in one easy lesson



Frank E. Cox illustrates how a city block can be converted

Operating Economics

C. E. Baugh, chairman
Pacific Gas and Electric Co.
San Francisco

C. J. Nevitt, vice-chairman
San Diego Gas and Electric Co.

WITH morning and afternoon general sessions on Friday and five parallel group meetings on Saturday morning, the Operating Economics Section got off to a good year's start with a meaty engineering and operating program at the Fresno conclave. Technical problems in connection with the frequency change being made by the Southern California Edison Co. were discussed by Alex Krohnberg. Many of the reaction turbines in the company's hydro plants were of compromise design and will not have to be changed. Runners in two plants will require changing. With steam turbines, one of the problems is vibration. Operation of generators at 60 cycles instead of 50 will result in a general raise in voltage of 20%. Because of the compensating effect of many factors, steady state stability will increase slightly and transient stability will be about the same.

Effect of reorganization of the State Industrial Accident Commission and recent changes in rules were discussed by Howard Miller of the commission. C. F. Wagner, Westinghouse Electric Corp., gave his first-hand observations of important differences in transmission, switching and relaying practices in Germany and the United States. Highest generator voltage found was 21,700 volts, and this to avoid transformation at underground power plants. Germany has extensive 220-kv. transmission, but most lines are short interconnections as opposed to long-distance transmission in this country. One ground wire is used and counterpoises are rare. To permit interchangeability anywhere in Germany, 220-kv. transformers were standardized in 100,000-kva. size. Standard size for 110-kv. transformers is 30,000 kva., with permanently mounted trucks for portability. High-voltage circuit breakers are of the low oil, air-blast type, a type with no exact counterpart in America. German engineers are sold on the Peterson coil, and it is widely used. Projected transmission included 400 kv., both a-c and d-c. Conductor for the a-c line would have consisted of four wires at the corners of a 16-in. square block to solve the corona problem. One 400-kv. d-c underground line was planned. Only one a-c calculating board was found in all Germany, as contrasted to 16 in this country.

Malloy Beardsley

A color film depicting modern methods of controlling various classes of fires was presented by Mr. Hough of the Walter Kidde Co. The picture was educational and informative and might well be used in employee fire fighting training programs.

A. C. Schwager, Pacific Electric Co., and O. E. Keeler, Westinghouse, had papers on high-speed reclosing of circuit breakers. Schwager presented results of tests showing that single-pole reclosing could be accomplished in 20 cycles with an arcing time of three to five cycles without re-strike, and concluded that single-pole reclosing would be successful at 220-kv. up to 120-mile line sections with the same dead period as with three-pole breakers. Keeler traced the rapid advance in high-speed reclosing throughout all voltage ranges for both air and oil breakers and the greatly improved technique in arc quenching during recent years with the Deion and other arc suppressors.

Urban mobile radio telephone and rural power line carrier telephone service were presented by W. H. Misson, Southern California Telephone Co., and Stanley Rapp, Pacific Telephone and Telegraph Co., respectively. Rapp's paper appears in full on page 56. Plans for early inauguration of urban mobile radio-telephone service disclosed that an experimental channel has been granted for a station in San Francisco, and it is hoped to start service by the middle of 1946. Radius of coverage is expected to be about 25 miles between moving vehicles and the fixed station, enabling a mobile subscriber to reach any Bell subscriber. Power companies displayed interest in the new service as a means of dispatching. Highway mobile radio-telephone service will come a little later.

Group Meetings

Modernization of oil circuit breakers probably took the spotlight in the Saturday morning group meetings. J. H. Vivian, Southern California Edison Co., told of his company's extensive program now under way. Forty-five 220-kv. breakers are to be rebuilt with factory parts for three million kva. interrupting capacity, 14 of them for five cycles and 31 for three cycles

Baugh Kipp

interrupting time. Forty-four 220-kv. breakers will be modernized with latest interrupting devices for two and one-half million kva. duty. The 45 breakers first mentioned will be furnished with pneumatic mechanisms of the most modern design. Each breaker will have its own air compressor and automatic devices to make each unit self-contained. In addition, the Edison company's program calls for extensive breaker modernization in the lower voltage classes. A. E. Brock, Pacific Electric Mfg. Co., described means of modernizing breakers made by his company. New operating mechanisms and modern arc quenching devices have progressively reduced interrupting times from twelve cycles to eight, then to five, and even three, cycles. Asked about modernizing the lower voltage breakers, Brock said that in general it does not pay to rebuild breakers below 15 kv.

O. A. Gustafson, General Electric Co., urged that operators seriously review over-all effect of any broad policy of overloading machines and of operating on strictly total temperatures. Manufacturers naturally lean toward caution in overloading and somewhere between the desire of the user to overload to get more kilowatts and the manufacturers' conservatism is the soundest policy. The user should keep better records and analyze more carefully all economic factors pertaining to deliberate overloading, he said.

K. V. Fletcher, General Electric Co., said that standardized unit substations are at present available in forms to meet economically any and all medium voltage applications, and that the trend toward safety, continuity, nice appearance, compactness and package units will bring unit substations into even greater favor.

Engineering and operating problems in the use of supervisory control were discussed by A. A. Straub, Southern California Edison Co. Edison has a program for an area involving 14 attended substations. Some construction work has already started. Nine stations will be operated by supervisory control and three will be semi-automatic with remote alarm. The 4-kv. distribu-

tion circuits will be provided with two-shot reclosers, and two semi-automatic stations will have one-shot reclosers on the 11-kv. circuits. Loop operation without reclosing equipment will be provided on 66-kv. lines. If this type of operation proves unsatisfactory, some form of reclosing will be established. Control channel will consist of two-conductor open wire construction.

C. N. Parker, California Electric Corp., said there was a fine balance in construction in deciding upon sags and tensions. He uses a maximum of 44% in thin territory, which is higher than recommended but results in a saving in height of poles without any resultant trouble—yet.

In a paper on methods in rural line construction, P. Suransky, PG and E, concluded that minimum labor can be arrived at by coordinating physical construction with other departments to avoid delays; using crews of adequate and trained manpower and properly equipped to do the job; using mechanical equipment where and when justified, and by providing competent supervision on the job. These elements of labor cost coupled with the minimum amount of material that can be economically justified, should result in lowest possible over-all line costs.

E. M. Wright, PG and E, in discussing grounding and testing devices for line work, said that an aluminum cylinder one foot long and 1¼ in. in diameter on an insulated stick had proved satisfactory in giving an audible spark under noisy conditions on 44-kv. lines and was a satisfactory means of testing for hot lines. Below 44 kv., some type of glow tube is generally used. Safety requires a ground stick at least six feet in length for voltages up to 110 kv. Above this, an extension stick can be attached to the ground stick. He suggested a glow tube on the hand end of grounding sticks to give a hot line indication before the ground is made.

K. M. Stevens, Southern California Edison Co., described a serious meter corrosion in ocean beach areas. Holes are eaten in meter bases and in some cases glass covers have been broken by the pressure of corrosion products. Field tests are under way with samples of various metals and different protective coatings to find a solution. The best material so far has been anodized aluminum coated with lacquer.

A paper describing a single-phase watt-hour meter and a thermal demand meter in one case was presented by J E. Bridges, Westinghouse. Discussion brought out a number of objections in the past against the thermal type demand meter. These were: 1. Difficulty of understanding the logarithmic principle, time interval, etc. 2. Necessity of a separate meter for measuring demand. 3. Difficulty of testing in the field. 4. Excessive temperature errors. 5. Zero stability. Most of these objections have been removed in modern thermal demand meters.

The transportation group, under H. B. Wylie, discussed transportation of work crews and utilization of surplus military vehicles. Several utilities have made use of some types of military automotive equipment, particularly the Chevrolet 1½-ton, four by four (four wheels and drive on four wheels), GMC 2½-ton, six by six and six by four trucks, as well as reconnaissance cars and weapon carriers. If vehicles are inspected before purchase, no trouble has been experienced as to condition. Prices are considered reasonable under present conditions of unavailability of new equipment.

In the generating station group meeting, in addition to Gustafson's paper, E. G. Gothberg, PG and E, presented a discussion of operating experience with various fuels. During the prewar period, good grades of fuel were available for generating plants. At that time large quantities of natural gas and low-sulphur, low-ash fuel oils were being burned. However, with the initial operation of PG and E's oil refinery plants, they undertook to burn quantities of refinery waste fuels, such as pitch, acid sludge and petroleum coke. In general it may be said, with the exception of petroleum coke, the refinery waste fuels are somewhat more difficult to handle, but do not present any appreciable operating problem. Coke, on the other hand, does present a problem and will require some modification in boiler design before it can be satisfactorily burned.

When it became apparent that sufficient facilities would not be available to house all those who wished to attend the conclave, member firms began to pare their attendance list. The knife seemed to fall most sharply on those who might have attended the Communication Group session, with the result that C. T. Malloy, discussion leader, found himself without a representative group.

The northern utilities were not properly represented at this session, which made it less valuable than would otherwise have been the case. However, the small group present managed to conduct an interesting and informative round-table discussion of two-way radio communication for central station companies. Topics considered included: re-allocation of frequencies and its effect on power utilities; relaxation of FCC Rule No. 10.231 to permit greater use of radio communication, and development of a national committee for power utilities, this committee to function with the Radio Technical Planning Board.

Administrative

F. U. Naylor, chairman
Pacific Gas and Electric Co.
San Francisco

Leon S. Heseman, vice-chairman
California Electric Power Co.
Riverside

WITH F. U. Naylor, PG and E, as chairman and Leon S. Heseman, Calif. Electric Power, as vice-chairman, this section held sessions so interesting that space was not available for all who wished to attend. The crowd overflowed out the doorway.

The Personnel and Industrial Relations session was conducted on Friday, with George Henderson, Coast Counties Gas & Electric, presiding. The morning session was devoted to supervisor-management relations and collective bargaining developments. The plans followed by various utilities and other electrical firms to educate and train supervisory groups were thoroughly described and discussed. The acceleration given this program by the war and the government-sponsored training courses was considered highly beneficial, and it was agreed that similar activities should be carried on regularly. Problems considered included the advisability of conducting training courses on a compulsory basis on company time or as voluntary sessions on the employees' own time. The merits of both alternatives were explained by representatives of firms employing one plan or the other. It was brought out that precedent was a potent force and that, when a firm established its first course either on company time or employee time, it is difficult to deviate on subsequent courses. The value of keeping supervisory groups—as an integral part of management—fully informed on company policies, practices and plans was emphasized.

The intricacies of collective bargaining were also discussed during the morning session, with a helpful inter-

change of experiences being made. As an example of the growing complexity of labor relations, it was brought out that as many as ten labor contracts may be involved in a relatively simple operation.

The group learned much of interest in its interchange of information regarding employee benefits. A wide divergence of such benefits was found to be offered by various firms but employees may expect them to become more liberal as time goes on. Practices of various companies in indoctrination of new employees were discussed. The group decided that most firms were overlooking the excellent morale-building value of acquainting members of the organization with the benefits to which they are entitled. As an example, it was brought out that most employees have only the haziest knowledge of their company's health and life insurance benefits. This lack of knowledge defeats one of the most important features of such plans, which is to give personnel the peace of mind such benefits provide.

Married Women

Although not on the agenda, the employment of married women was discussed at some length. While public pressure caused many firms to release married women during the depression, this practice was abandoned during the war. The group agreed that married women are very satisfactory employees and are now generally employed. Location and time seem to be the factors which influence the employment of married women. It is expected that business and professional women's groups will actively encourage the continued employment of married women in normal times but that, during times when there aren't enough jobs to go around, general public opinion will require that men and single women be given preference over married women in the matter of employment.

Contrary to the expectations of many, it was developed that no particular problem has arisen in connection with the re-employment of returned veterans. All represented firms have established programs to welcome their veterans, and one large utility has assigned a man to full-time counselling of its veterans.

Customer Relations

On Saturday, the Customer Relations Council, with T. P. Ludcke, PG and E, presiding, considered the following topics: 1. Standards of customer service on the five-day work week; 2. informing customers about electric utility issues; 3. informing employees about the company's business, and return to monthly billing in lieu of bi-monthly billing in view of public relations and collection problems.

Representatives of utilities which have returned to the five-day work

Benz Ross

week assured the group that the public has accepted the new schedule with understanding. It was emphasized, however, that arrangements have been made to provide emergency service on Saturdays, similar to that supplied on Sundays and holidays, so that customers are not inconvenienced by the return to a five-day work week. Utilities which have not already done so plan to return to a five-day work week in the near future.

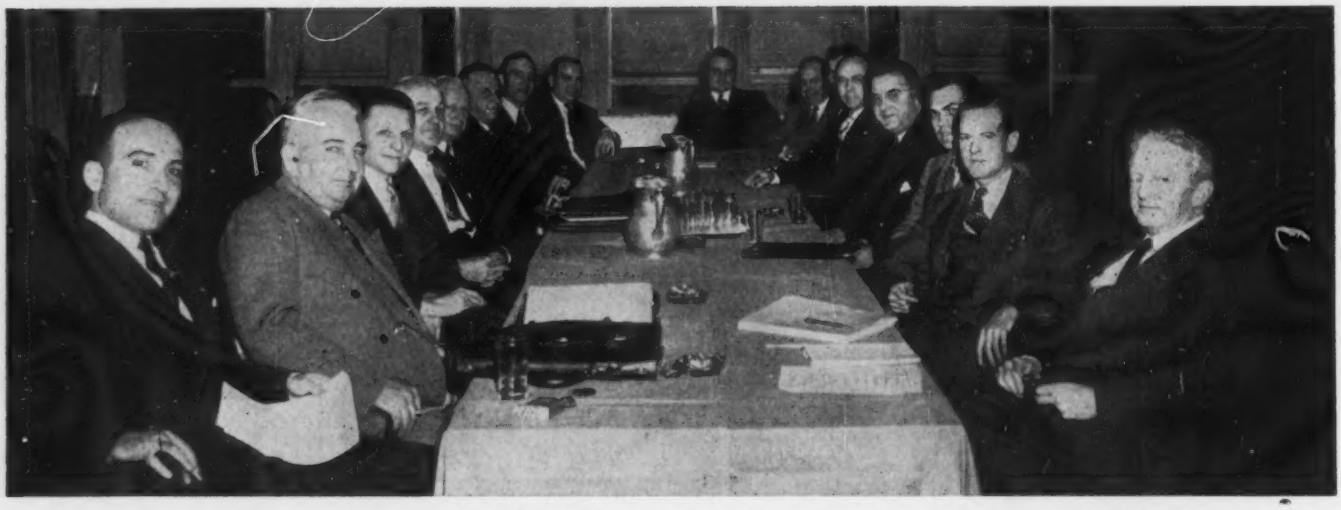
Agreeing that public good will has a value as tangible as that of a utility's capital equipment, the group was unanimous in believing that much good results from acquainting the public with the operation of a utility. Almost invariably, customers are tolerant and sympathetic when informed as to the true reasons for delays in service extensions and other unavoidable inconveniences. It was brought out that material shortages cause such delays, as often as labor shortages.

A more comprehensive program for informing employees about company operations could profitably be adopted by nearly all businesses, the group decided. Pointing out that employees appreciate and benefit from considering themselves as important parts of a business, the group agreed that member companies should adopt programs designed to foster a closer relation between management and labor.

Although some eastern utilities had bi-monthly billing schedules before the war and plan to continue them indefinitely, the major utilities in the West are planning to return to monthly billing as soon as practical. In fact, the discussion brought out that some Western utilities continued monthly billing during the entire war period. In addition to labor shortages, the lack of sufficient billing machinery causes some utilities to temporarily continue bi-monthly billing. Not even the fuller utilization of present billing machines could solve this problem, it was mentioned, because the machines now in use are so well worn that a doubling-up in their use probably would cause them to break down completely before replacements could be obtained.

● Col. Franklin T. Matthias in charge of the Hanford project for making of atomic bombs, addressed a joint meeting of engineering groups, including the AIEE, and the Electrical Maintenance Engineers Assn. of Northern California, at PG and E Auditorium, San Francisco, recently. Colonel Matthias also addressed the San Francisco Electric Club on the same subject.

Hartley Long Grunsky Rice Naylor Heseman



Representatives from ten Northwest power companies at the Personnel Section meeting in Seattle, Dec. 5-6

Exchange Views Regarding Personnel

SEVERAL phases of personnel work were explored by six committees of the Personnel Section, Northwest Electric Light & Power Assn. at the section planning meeting in Seattle, Dec. 5 and 6. Continuing studies for each committee were outlined with the view to having their reports brought in for consideration at the section's annual spring meeting tentatively scheduled for early next May in Salt Lake City.

R. H. Sessions, Idaho Power Co., section chairman, opened the meeting, which was attended by personnel directors and some of their staffs of the member utility companies of the association, with a discussion of the functions of the personnel department and the place the department should occupy in the utility organization. Ideas advanced in this part of the program were that the personnel functions in a utility company should be handled by a department and not by some official as a side issue; that the department should attempt to bring the thinking of personnel men up to top management; that the department should not work too close to top management, but should be a place where the employee can get his story heard without embarrassment; that the department should make plans and recommend policy and then administer the policy after approval by top management.

No personnel department among the companies in the territory takes a major part in the negotiation of union contracts, though some personnel directors sit in on these negotiations. Some personnel departments administer the contracts after they have been made.

J. T. Bradshaw demonstrates "Yahoodie" lifting weight—rightly and wrong

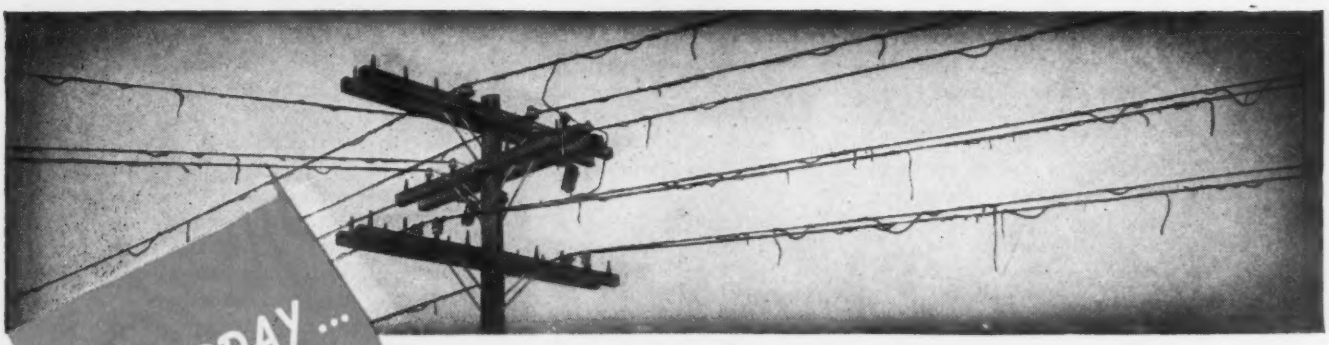
The committee on sick leave compensation and medical aid headed by L. W. Nims, Utah Power & Light Co., found a wide variety of practices with respect to payment of sick leave compensation, and came to the general conclusion that a well defined policy should be established and be made known to the employees. It was generally agreed that a set of rules covering excused absences should be set up. The committee agreed to study the question of vacations and excused absences.

Donald W. Prairie, Northwestern Electric Co., recently returned from military service and placed in charge of his company's personnel department, acted as chairman of the physical requirements committee. In the discussion of this subject, most of the companies were found to require physical examinations, and it was generally agreed that these should be conducted with the examining doctor knowing the class of job the applicant is to take. There should be a follow-through on the employee's physical record by periodic re-examination.

The swing toward the social aspect of personnel work has thrown considerable emphasis on insurance and pension plans, stated Kimball Jack, Washington Water Power Co., acting chairman of the insurance and pension committee. Employees seem more interested in the security that comes from pensions than in insurance. Ample safeguards should be thrown around any pension plan that is established and, once established, the company should not be permitted to withdraw or discontinue it. Pension plans should be fully published to the employees so that the most can be made of the morale building effect of such plans.

Because many companies in the association have turned over their accident prevention and safety work to the personnel department, the accident prevention committee of the association has been transferred from the Engineering Operation Section to the Personnel Section, with J. T. Bradshaw, Puget Sound Power & Light Co., chairman. The committee contains engineers as well as safety men, however, and a close cooperation is maintained with the Engineering Section, because the engineers have responsibility for designing safe working standards.

The field superintendent is a key man in any effective safety program, said Bradshaw. Union problems should not be permitted to come up in safety meetings. Every opportunity should be



YESTERDAY . . .
"Festooning" was a common trouble . . .

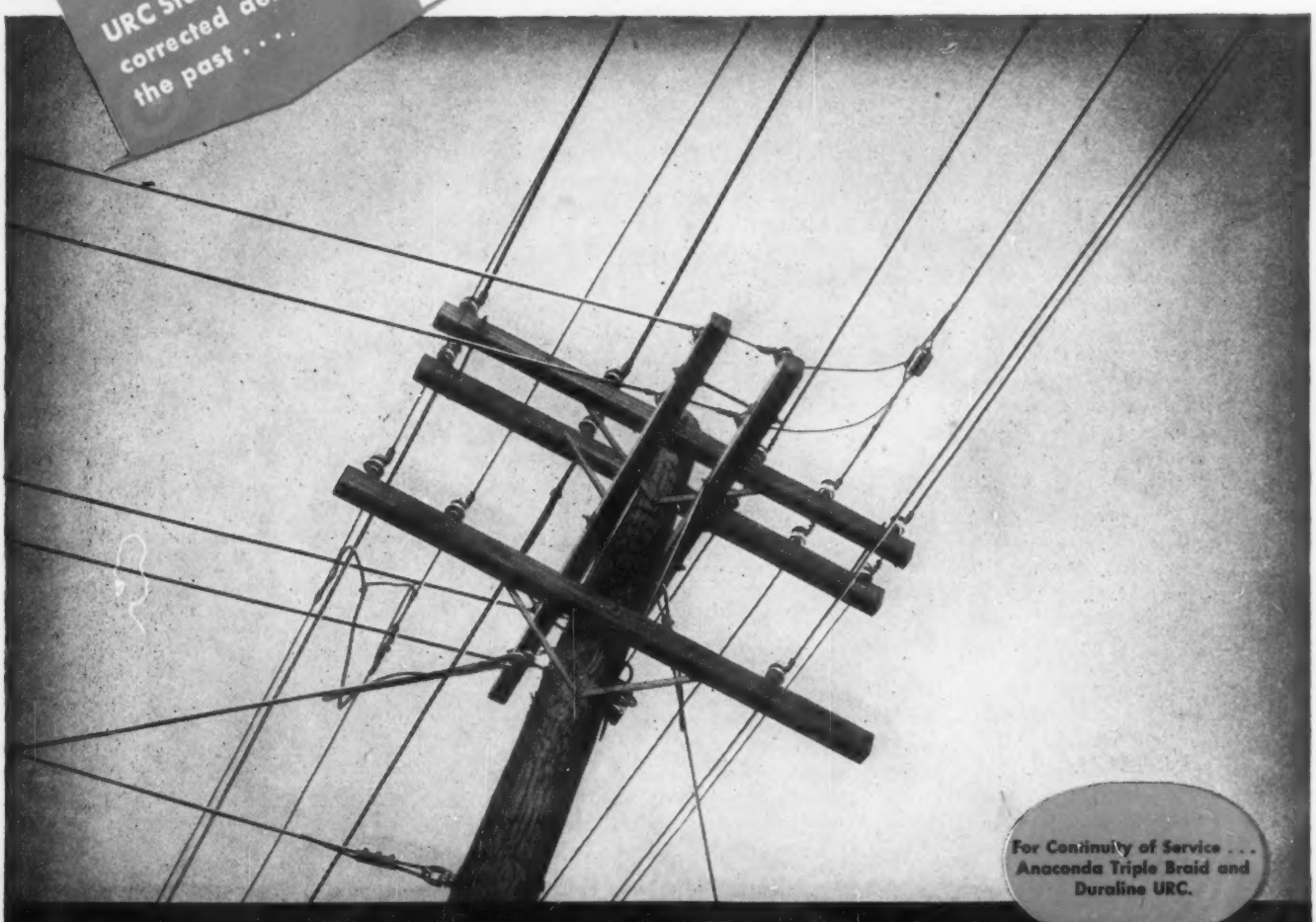
TODAY . . .
URC Standards have corrected defects of the past . . . .

Since URC was established, Weatherproof is a lasting investment . . .

ANACONDA URC Weatherproof *stays put!* It assures a rugged, maintenance-free line. No coming apart—no festooning. Squarely back of Anaconda URC is Anaconda research, strict engineering control and testing. *Specify Anaconda URC Weatherproof.*

46334

ANACONDA



For Continuity of Service . . . Anaconda Triple Braid and Duraline URC.

LOOK TO *Anaconda* FOR WEATHERPROOF THAT LASTS

taken to dramatize safety wherever possible by the use of moving pictures or mechanical devices. An example of the latter was a demonstration of the proper way to lift, through the "Yohoodie" figure made by Puget Sound Power & Light Co. for showing to employee groups. The safety men were admonished to know the safety code rules under which they work and the electrical inspectors who administer this code.

Most of the discussion in the planning committee, under C. W. Sherman, Puget Sound Power & Light Co., chairman, revolved around problems related to the returning service man. One of the problems encountered has to do with the man who has advanced rapidly in the service, perhaps beyond the capacity required for his former job in the company. Most generally adopted policy in such cases is to place the man in the job he had when he left with the idea of promoting him as rapidly as possible. One company proposes not to do much upgrading until all the men get back and the abilities of all can be appraised. It was pointed out that the companies have a moral obligation to take their share of young men returning from service who went in direct from school and never worked before. Some companies are doing a lot of education with returning veterans, informing them of their rights under the GI Bill, giving them the benefit of an interview by a psychologist and attempting to place them where they will be happiest. One company has adopted the policy of placing returned veterans in the advanced status of employment that they would have attained had they not gone to war.

Companies were divided in their use of supplementary pay for apprentices provided by the government under the GI Bill. In some states, the complications of state apprenticeship laws and union policies excluded the possibility of taking advantage of this provision of the bill.

There was considerable discussion of what constituted an efficient personnel department and it was found that this depends in large part on the functions assigned to the department by management. Considerable variation in these functions obtains among the companies represented in the association. A committee to make a survey of the forms used by the personnel department has been appointed with G. B. Bocarde, Pacific Power & Light Co., chairman. L. T. Matter, Puget Sound Power & Light Co., reporting for Bocarde, threw out the caution that it is possible to become top-heavy with forms and routine. The committee is to survey the situation among member companies and to report findings at the next meeting of the section.

Job analysis was said to be a fruitful undertaking for the personnel department of a company by O. A. Peterson, B. C. Electric Railway Co. Adequate analysis probably will reveal some jobs to be overpaid and some underpaid. The unions and the employees generally approve job analysis.

The meeting heard two luncheon talks, one by Dr. Ralph M. Stolzheise, a practicing neuropsychiatrist in Seattle, speaking on *Psychiatry in Industry*. The other told of the growth of the Northwest territory of the National Association of Foreman, through the establishment of local chapters. Ken Wells, regional manager for this association, presented this subject, bringing out the advantages to management to be gained by fostering the organization in their own companies. The foreman is a key man in the management team, said Wells, and the association is raising the job of foreman to the status of a profession through the establishment of high standards.

RMEL Plans

The Rocky Mountain Electrical League, giving impetus to its 1946 program as enunciated at its recent annual meeting, called a conference of the executive committee, Dec. 14, and another for utility managers, Dec. 15.

The significant promotions will stem from the pair of meetings: (1) Adequate wiring is budgeted at $7,500 for the current year; (2) an electrical exposition will be held in Denver during early or late fall (depending on availability of appliances and other household electrical equipment), and (3) area-wide Christmas lighting — Colorado, Wyoming, New Mexico and South Dakota—will be fostered on a competitive basis.

Manager Ralph L. Hubbard presented to the executive committee a modest request for $2,000 to develop his adequate wiring program, but so enthusiastic were his confreres over the immediate need to get into action on this front that they boosted his figures almost 400%. Electric utilities — as agreed on by the managers—will make adequate wiring an aggressive phase of their advertising. This will supplement the league's campaign to be waged with handbooks, motion picture projections, display boards, etc.

In addition, Meryl Mentzer, newly appointed field representative of RMEL, was charged by both executive and managers groups with responsibility to develop local electrical leagues throughout Rocky Mountain territory, as a further means for disseminating the glad tidings that peace is here, electrical equipment is on the way, and the utilities need an outlet for their war production-born power sources.

An examination of electrical codes in Colorado, Wyoming and New Mexico will be undertaken, with a view to strengthening code requirements. Colorado operates under municipal codes, New Mexico under a state inspection system, and Wyoming, though entirely local in its inspection set-up, probably will profit by guidance from the experince and results obtained through proper codification and enforcement.

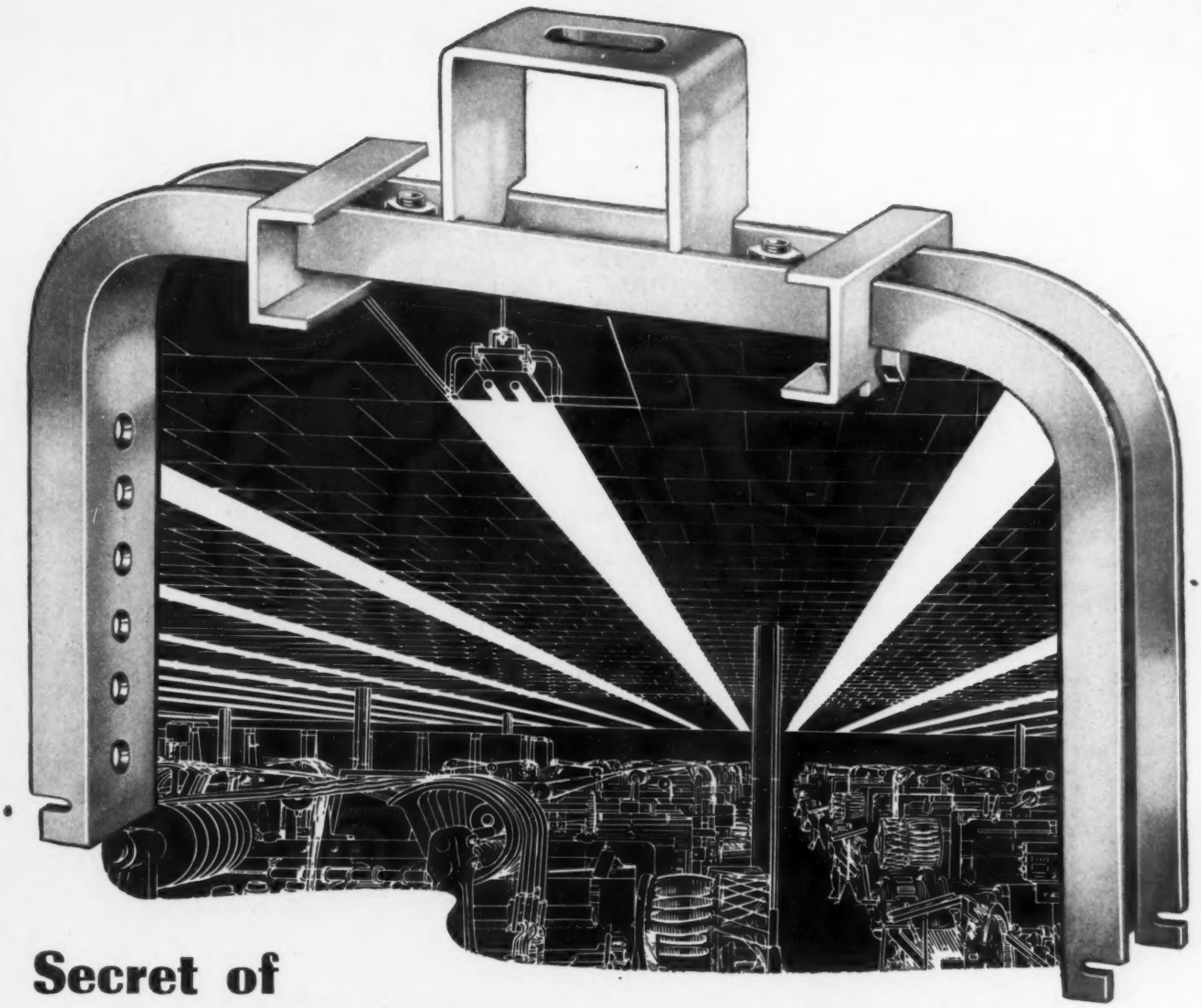
The utility managers, who concerned themselves strongly with engineering problems, found electric welding installations hooked informally onto power lines a considerable embarrassment in rural areas. Unstandardized equipment, bought by individual ranchers and farmers, frequently pulls twice the rated load causing failure to service in the neighborhood.

Disclosure was made in the course of the two-day conferences that private power companies in Colorado and Wyoming are collaborating with REA managements on division of rural territories to be served. This meeting of minds has been accomplished partly by a liberalizing of policy on the part of private management which reduces installation costs to prospective customers in new territory, and by preliminary negotiations allocating areas to each concern.

While power from the Colorado-Big Thompson irrigation and generating project is a factor to consider in planning for the future, reports varied as to when Reclamation Bureau stations will be in position to supply electricity. Most optimistic prediction was 1947; others varied up to latter 1950. Discussions also indicated that the Big Thompson enterprise, originally planned principally for irrigation purposes, will be predominantly (from a cost viewpoint) an electric generating project.

Although definite dates were not established, plans were made for bimonthly conferences of utility managers in various parts of RMEL territory, and similar arrangements for meetings of accounting and engineering sections. The tentative schedule was adopted in order to allow attendance by executives and operating personnel at some point fairly close to their headquarters, thus providing those unable to make an extended trip with an opportunity to keep up to date on activities by personal contact. An early meeting of managers will take place in New Mexico; one for engineers and accountants in Pueblo, Colo.

Definite dates for the 1946 annual convention—a big bang-up event reminiscent of prewar eras—were fixed for Sept. 5-7 at the Stanley Hotel, Estes Park, Colo.



Secret of CEILINGS UNLIMITED

. . . the patented Miller Ceiling Furring Hanger for any type furred ceiling

Exclusively Miller's, this ingenious hanger licks many old construction problems—without creating new ones. It is the "can do" behind today's trend of planning interiors *around the lighting.*

No more laborious fitting of recessed lighting into hung ceilings. Instead, simply hang Miller Ceiling Furring Hangers from the structural ceiling—and hang furring, tile and Troffer Lighting System *from the hangers!*

Less than half the usual supports are needed. This means savings—as well as more "above-ceiling space" for piping and air conditioning ducts. Savings in wire, wiring and conduit costs are also substantial. Quick leveling means are provided.

But that's just the beginning! The whole fascinating story is told in CEILINGS UNLIMITED. Miller engineers and distributors are in principal cities.

THE MILLER COMPANY • MERIDEN, CONNECTICUT

ILLUMINATING DIVISION
Fluorescent, Incandescent Mercury Lighting Equipment

HEATING PRODUCTS DIVISION
Domestic Oil Burners and Liquid Fuel Devices

ROLLING MILL DIVISION
Phosphor Bronze and Brass in Sheets, Strips and Rolls

WAR CONTRACTS DIVISION
War Materiel

FOUNDRY DIVISION
Non-Ferrous Metal Castings

MILLER
SINCE 1844

Dave E. Harris Given the McGraw Award

Four hundred industry men join in tribute to pioneer wholesaler at San Francisco gathering

DAVID E. HARRIS, vice-president in charge of Pacific Coast operations, General Electric Supply Corp., was awarded the 1945 Medal for Cooperation given under the James H. McGraw awards for electrical men, at a dinner at the Palace Hotel, San Francisco, on Dec. 28. Over four hundred electrical people from all parts of the West Coast were present.

Basis for the award, in the opinion of the judges, was Dave Harris' 40 years of active participation in virtually every Pacific Coast cooperative activity beginning with the Order of Jove and extending to the present day. He was instrumental in originating the first convenience outlet compaign, which was the forerunner of the present-day adequate wiring activity, and in developing the uniform electrical code and the unsafe appliance ordinance.

In outlining the basis under which the award is made, A. Emory Wishon, vice-president and general manager, Pacific Gas and Electric Co., pointed out that James H. McGraw, founder of the awards, had just enjoyed his eighty-fifth birthday at Saratoga, Calif., where he now resides. The awards were established by Mr. McGraw, Wishon said, to encourage constructive thinking for the advancement of the electrical industry. In winning the 1945 award Dave Harris becomes the fifth Westerner to be so honored, he pointed out. He named the predecessors, beginning with H. H. "Kelly" Courtright in 1928, and including the late C. T. Hutchinson in 1930, Gaylord B. Buck of Denver in 1934 and R. E. Fisher in 1936.

Dr. Paul D. Cadman of the Henry J. Kaiser Co., who has known Dave Harris since shortly after the turn of the century, traced his career in the electrical industry, and drew from it a moral on the tangible benefits to be derived from practical cooperation among all groups in the electrical industry. Harris was born in Yosemite Valley, in 1879 and raised on a stock ranch near Oakdale, Calif., Cadman said. His only formal education came from the Oakdale Grammar school. At 19 he tired of country life and came to San Francisco, where he obtained his first job as a $3.50 per week office boy with the John M. Klein Co., an electrical jobbing house. Eventually the Klein company became part of the Pacific States Electric Co., a firm which was organized in 1909.

In the succeeding years Dave Harris became salesman, sales manager, vice-president and finally president of Pacific States. When the house became part of the General Electric Supply chain, Harris became a vice-president and a director of that organization.

Cadman recited a long list of civic and electrical activities in which Dave Harris has played a prominent part, starting with the Jovians in 1910. He was one of the founding group of the San Francisco Electric Club in 1912, and also of the California Electrical Cooperative Campaign (now the Pacific Coast Electrical Bureau). He has served continuously on the directorate of that organization and on the board of the Pacific Coast Electrical Assn. since its inception. He headed a multiplicity of committees of both groups at various times.

In presenting the medal and the accompanying purse of $100, George C. Tenney, editor, ELECTRICAL WEST, who acted in behalf of the awards committee, told how James H. McGraw, founder of the McGraw-Hill Publishing Co., set up an endowment of $20,000 in 1925, proceeds from which were to be used "to express industry appreciation of a personal contribution to the advancement of the electrical industry." He recited how D. E. Harris had been selected as the 1945 medalist by a committee of judges consisting of W. J. Kranzer, Crannell, Nugett & Kranzer, New York; N. J. McDonald, vice-president, Thomas & Betts Co., Elizabeth, N. J.; Howard L. Miller, Utilities Engineering Co., Philadelphia; L. A. Scofield, general sales manager, Consolidated Edison Co. of New York, and S. B. Williams, editor of *Electrical World*.

He read the following citation, which outlines the basis on which the award was made to Harris:

"Some men in an inspired moment conceive a wholly unselfish activity from which as the result of collaboration great benefits accrue to all branches of the electrical industry and then there are others like David Edward Harris who live a life of cooperation in the belief that the different interests that make up this industry are interdependent and that the bounties of good to one are shared by all. It is to such men that the industry with unerring instinct turns for guidance, for judgment and for friendly advice. Dave Harris, now vice-president, General Electric Supply Corp., San Francisco, has been a spark plug of industry cooperation in California from his early days as a jobber's salesman. Whenever a cooperative program was initiated, whether by others or by himself, he has been one of its staunch supporters and earnest workers.

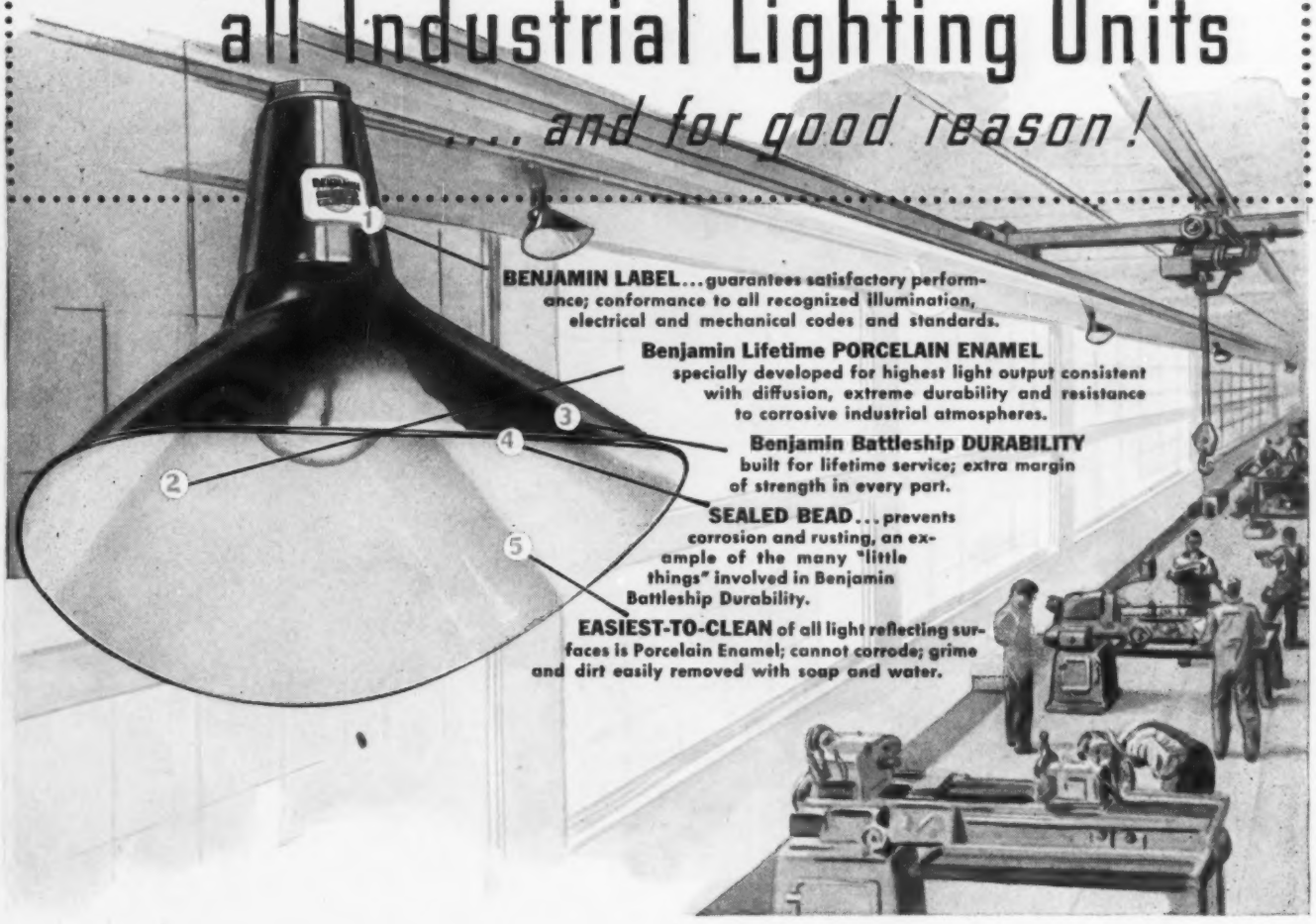
Harris

"His name will be found among the organizers of almost every important cooperative movement within the industry in California in the past quarter of a century. In 1918 he was one of the founders of the California Electrical Cooperative Campaign, the first state-wide program of contractor-dealer and industry sales help and promotion in the West. It was this movement that launched the first 'convenience outlet campaign' which might be said to be the forerunner of what is now the national campaign for adequate wiring. Out of this pioneer cooperative project came the California Electrical Bureau and the Pacific Coast Electrical Bureau both of which he has served as chairman and continuously from their beginning as a member of the boards of directors. Likewise he has served without a break as a director of the all-industry organization, the Pacific Coast Electrical Assn. His was the task of guiding this body's Code and Ordinance Committee and Red Seal Adequate Wiring Committee, sometimes as chairman and always as a member. From the first committee came a uniform electrical code, now widely accepted in the state, and an unsafe appliance ordinance, adopted in 83 California cities and elsewhere in the West.

"So much has he identified himself with the common good of the industry that he is known among electrical contractor groups as a champion of fair

One of the Most Popular of all Industrial Lighting Units

... and for good reason!


1
2
3
4
5
BENJAMIN LABEL... guarantees satisfactory performance; conformance to all recognized illumination, electrical and mechanical codes and standards.
Benjamin Lifetime PORCELAIN ENAMEL specially developed for highest light output consistent with diffusion, extreme durability and resistance to corrosive industrial atmospheres.
Benjamin Battleship DURABILITY built for lifetime service; extra margin of strength in every part.
SEALED BEAD... prevents corrosion and rusting, an example of the many "little things" involved in Benjamin Battleship Durability.
EASIEST-TO-CLEAN of all light reflecting surfaces is Porcelain Enamel; cannot corrode; grime and dirt easily removed with soap and water.

Benjamin Elliptical Angle Reflectors

Your Best Solution to Many Lighting Problems!
A Lifetime of Economical, Efficient and Trouble-free Service!

Thousands of industrial plants have found in the Benjamin Elliptical Angle Unit a most satisfactory and economical solution to certain special lighting problems quite commonly found in Industry. For this unit is especially designed for the lighting of many locations where overhead obstructions make overhead illumination difficult or unsatisfactory . . . for the lighting of locations where high ceilings may require special units for adequate illumination of the vertical surfaces . . . and for the localized lighting of many vertical areas where fairly large areas are involved, etc.

For complete details on these units (available in a wide range of sizes from 75 watt to 750-1500 watt), write for free Data Bulletin.

BENJAMIN ELECTRIC MFG. CO., DEPT. J DES PLAINES, ILLINOIS

Specify- **BENJAMIN** TRADE MARK

Elliptical Angle

PORCELAIN ENAMEL LIGHTING UNITS
Distributed Exclusively through Electrical Wholesalers

1212

play, one who would be a 'friend in court' to present their views fairly to other wholesalers. For his contribution of never failing cooperation and constructive service to the electrical industry for more than 40 years, the Committee of Awards, upon recommendation of the judges, have awarded David E. Harris the 1945 Medal for Cooperation and Purse, given under the James H. McGraw Award."

Tenney also presented the leather-bound book containing the original nomination, together with scores of letters seconding Harris' consideration by the committee of judges.

Music during the dinner was provided by an NBC string orchestra furnished through the courtesy of John Elwood, manager of KPO, and by a group of vocalists headed by Austin Mosher.

Portland Electric

T. W. Fitch, illuminating engineer, Portland General Electric Co., was named president of the Portland Electric Club at the annual meeting, Dec. 13. He succeeds Stanley O. Burkholder, U. S. Rubber Co.

Other new officers are first vice-president, R. D. Hyneman, Graybar Electric Co.; second vice-president, D. O. Bergey, Northwestern Electric Co.; secretary, Leonard Kallen; treasurer, George Bocarde, Pacific Power & Light Co.; sergeant-at-arms, L. C. Stewart, Bonneville Power Administration. Newly elected directors are S. MacMurray, Armstrong Heat Control Co., and G. A. Charleston, Eoff Electric Co.

Among the committee reports presented, the membership report by A. B. Cayo, Portland General Electric Co., chairman, showed that 56 new members have been taken in during the past year and that the club now had a total of 233 active members.

AIEE Appointments

Spokane Chapter AIEE has elected two new officers to replace Aluminum Co. of America engineers who have left the city, according to J. F. Gogins, president of the local chapter.

W. E. Matthews, vice-chairman of the chapter while employed at the Mead reduction plant, has been transferred to Bowdin,N. C. Robert Reis, formerly at the Trentwood rolling mill and secretary-treasurer of the chapter, has taken a position as engineer of the Grant County, PUD, with headquarters at Ephrata, Wash.

Duane H. Olney, a Washington Water Power engineer, has been elected vice-chairman of the Spokane group, and H. C. Glaze, Jr., of General Electric, has been chosen secretary-treasurer. Glaze was on the executive committee, and T. W. MacLean, Washington Water Power, was chosen to fill that post.

Seattle Club

R. A. Church, Puget Sound Power & Light Co., secretary of the Electric Club of Washington for several years, has been renamed to that post by President O. A. Alderman; renamed treasurer was Charles W. Allison of Puget Power.

Committee chairmen, newly appointed by Alderman, include: John Lawton, Graybar Electric Co., program; Tom Widrig, Trumbull Electric Mfg. Co., membership; George Boyd, Westinghouse Electric Corp., budget; R. B. Lane, Industrial Electric Co., adequate wiring; H. C. Gerster, General Electric Supply, industrial planning; Capt. S. I. Sanislo, Seattle Fire Department, safety; W. W. Jewell, Westinghouse Supply, legislative; Harry Anger, Puget Sound Power & Light Co., social; R. A. Walker, Puget Sound Power & Light, recent president of the club, sergeant-at-arms.

Denver NECA

Denver's newly established Rocky Mountain Chapter of the National Electrical Contractors Assn., under the driving impetus of Pat Price, secretary, is intensively working out an apprenticeship program under which former G.I.s will avail themselves of the G.I. Bill of Rights. Price, personally, has been bending every effort to iron "bugs" out of the procedure, and, with the aid of a very live committee, expects to help coach veterans through apprenticeship gradations to full journeyman status.

Price issues frequent bulletins, all of which carry a crusading note. He is now urging that contractors develop their talents as salesmen: "We, as electrical contractors, are *salesmen*, and do sell most installations that we make. In many cases we . . . double, treble and quadruple the original size of the job by advising architect, owner, or engineer as to the requirements needed."

At each meeting of the group a representative of jobbers, manufacturers, or other branch of the electrical industry is invited as guest to explain their ideas, opinions, policies as guides for contractors.

● Electrical Contractors and Dealers Assn. of San Joaquin County Inc., held its annual meeting and election of officers and banquet on Dec. 14. James E. McCarty of the Bright Spot Electric Co. was elected president. Other officers elected were Fred T. Schooley, vice-president; William V. Kelly, secretary-treasurer. Retiring president, Grover A. Grider, and Rolly Goold were elected to the board of directors to serve with the officers elected. E. H. Grogan will continue as executive secretary of the association, a position which he has held for the past nine years.

● Three Western wise men from the East reported their observations to the Southern California Section, Illuminating Engineering Society, Dec. 11 meeting, Los Angeles. George M. Rankin, regional vice-president, Southern California Edison Co., had been to the IES council meeting in New York and also visited a number of factories. A. I. Benedict, illuminating engineer, San Diego Gas & Electric Co., had likewise made a trip to the East to gather ideas on lighting technique and new developments. Charles D. Gibson, chairman of the section, had attended a council on schoolhouse construction in Cincinnati.

● Charles F. Wagner, manager, central station engineering, Westinghouse Electric Corp., East Pittsburgh, Pa., told the San Francisco Electric Club, Dec. 10, the observations of a group of engineers sent to Germany immediately after cessation of hostilities to check up on German engineering techniques. He outlined the few develcpments of any importance made by German engineers during the war, the most notable of which was a projected 400-kv. transmission line. He reported very little damage to electrical facilities despite intensive bombing.

Oregon Section IES at its December meeting heard Thayne J. Logan of Barrett and Logan Architects, who discussed color in relation to modern building. Logan has made a specialty of color and of lighting in its relationship to color. At its recent joint meeting with the Portland Electric Club, the section had as its speaker Walter E. Potter, General Electric Co. lighting engineer, who told of late developments in lighting sources and new applications of these sources in various designs.

Walter Potter, Portland, GE lighting engineer, was in Vancouver recently to address a joint meeting of the Association of Professional Engineers, the Illuminating Engineering Society, Engineering Institute of Canada, Architectural Institute of B.C., Vancouver Electrical Assn. and engineering students of the University of British Columbia. *Light Designed for Seeing* was his topic.

Dr. Howard C. Hall was the speaker and *Light and Sight*, the subject of the December meeting of the Washington Section IES. The section has changed its regular meeting date from the first Tuesday to the second Thursday of the month.

NATIONAL

ABC Cable

ARMORED BUSHED CABLE

National Electric
PRODUCTS CORPORATION
Pittsburgh 22, Pa.

NEWS of the industry

LOCAL OWNERS TO GUIDE UTILITY MANAGEMENT

Right of Arizona power-users to guide policies of Central Arizona Power & Light Co., through their recent purchase of 125,000 shares of the utility's 840,000 shares of common stock, was emphasized in a joint statement issued recently in Phoenix, Ariz., by the board of directors and a committee of the new common stockholders.

Later, according to a letter sent to Phoenix stockholders by their advisory committee, it was pointed out that "local ownership will bring about a condition of the company which will be more responsive to local needs of the consumers as well as protecting the investments of the stockholders."

Stressing the fact that local citizens have been pledged a counseling voice in the company's affairs, it was stated that expansion of the present five-member board would be made at the annual stockholder's meeting next May, by amendment to the articles of incorporation. In the meantime, the letter added that the existing board assured the committee it would be "delighted to have the assistance, support and advice of the local stockholders."

Increase in purchase of stock in Central Arizona Power and Light by Arizona users stemmed from a campaign which was begun some months ago by businessmen and civic leaders in Phoenix.

Olds Tells Policies for Multi-Purpose Projects

Speaking before the California Water Conference in Sacramento last month, FPC Acting Chairman Leland Olds stated that the commission believes that multi-purpose development programs for river basins must be in terms of a single comprehensive plan which recognizes the prior importance of irrigation, flood control and navigation over power development. For unity of approach, he recommended giving complete responsibility for the long-range accomplishment to a regional organization.

"California's program," he said, "should be considered as a part of a larger program embracing the eleven-state region, since the state 'cannot safely assume' that it will remain self-contained so far as its energy requirements are concerned." For the eleven-state area, he sees possibility of 50 million kilowatts additional power from river developments.

Pointing out that FPC thinking is along regional lines, he stated: "Because decentralization of industry and population is important in terms of defense in an atomic age, as well as in terms of national well-being, we are particularly interested in the contribution which widely distributed power can make to the development of balanced economies in those areas which have fallen behind in industrial development."

Northwest Engineers Study Electric House Heating

Experiments to obtain accurate records in home heating costs will be undertaken by the Portland General Electric Co., assisted by engineers of the Westinghouse Electric Corp. and General Electric Co.

Meters and instruments will be installed in 75 typical residences of the more than 300 homes in Portland already equipped for heating by electricity. The test is to be a basis for determining the type of house heating equipment most suitable for the climate and for figuring a rate structure to be offered for electric heating service.

Preliminary figures already have been tabulated for 20 electrically heated Portland homes through 1942, 1943 and 1944. In these inconclusive tests an average heating cost rate of $78.80 annually was indicated. Homes tested ranged from three to eight rooms with power bills from $35 to $142.

● SOUTHWESTERN PUBLIC SERVICE Co. has applied to the Federal Power Commission and the New Mexico Public Service Commission for permission to acquire from Robert Johnston of Oklahoma City electric facilities serving Santa Rosa, N. M., and vicinity. Proposed purchase price is $115,000, which would include a generating plant and distribution system serving some 433 customers.

● SIERRA ELECTRIC Cooperative has taken to the New Mexico Supreme Court its attempt to have the town of Hot Springs, N. M., enjoined from building and operating electric transmission and distribution lines in Sierra County. The co-op appealed to the higher court from an order dismissing the injunction action.

USBR MAKES REPORT ON MOUNTAIN HOME PROJECT

About 620 million kilowatt-hours of firm hydroelectric power annually would be generated at the Payette unit of the Mountain Home multi-purpose project in southwestern Idaho, if recommendations in the recent USBR report are accepted. Irrigation of 230,000 acres is contemplated in the project, which has been submitted to the governors of Idaho, Oregon and Washington and to the Secretary of War.

The project would use Boise River waters for irrigation in the Mountain Home area, replacing them with surplus waters diverted from the Payette River watershed.

Included in the report are plans for construction of one re-regulating dam and reservoir and one storage dam and reservoir having a combined storage capacity of approximately 1,337,000 acre-ft., two diversion dams, three power plants with a total capacity of 165,000 kw., canal systems and electric transmission lines, substations and other facilities.

Cost of the project is estimated at about 95 million dollars, based on 1940 prices.

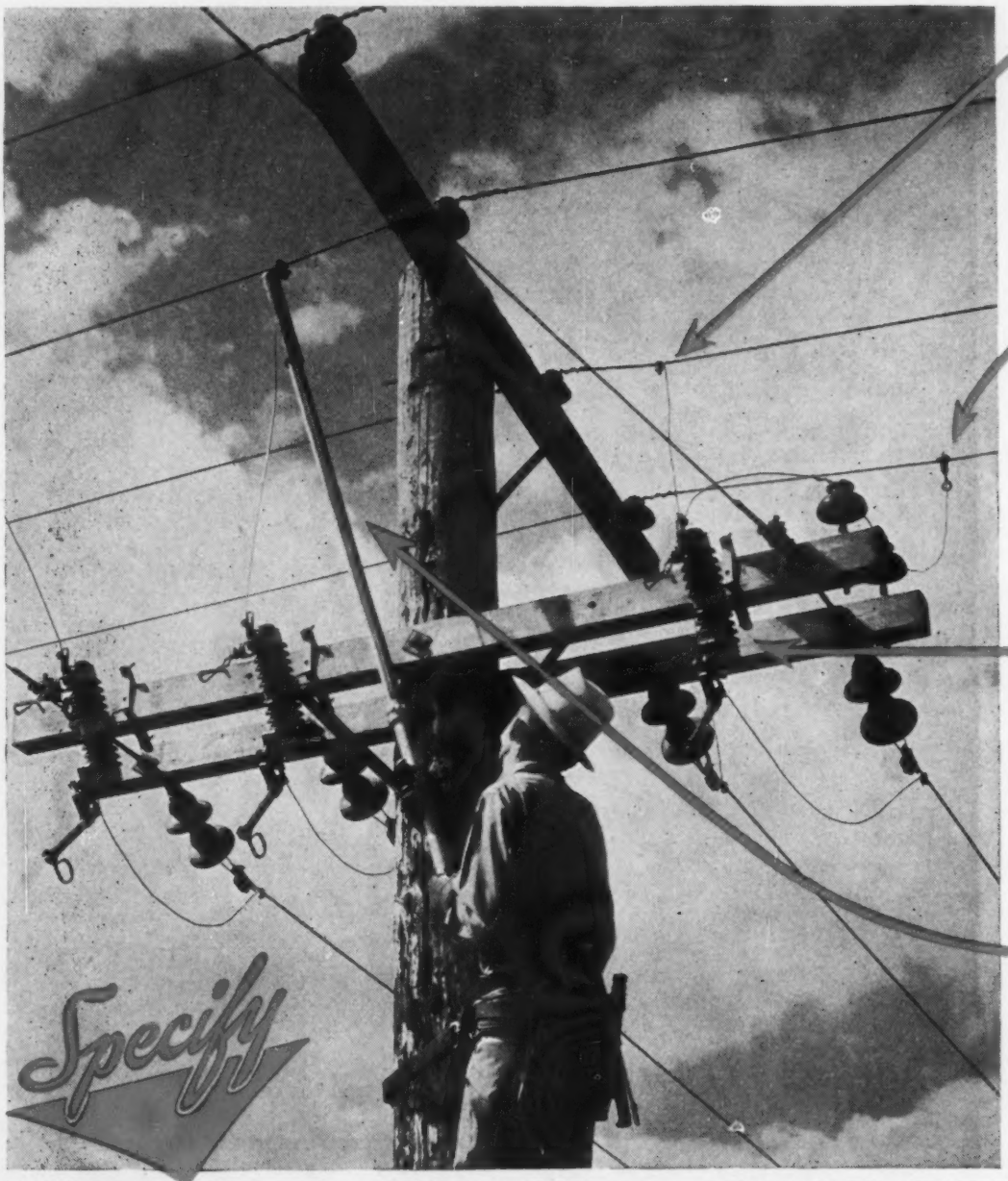
New Mexico Purchase Plan Authorized by Commission

Purchase of the New Mexico Power Co.'s Dawson division properties by the Trinidad Electric Transmission, Railway and Gas Co. of Trinidad, Colo., has been authorized by the Federal Power Commission.

Base price was set at $526,101 for facilities including a 4,000-kw. steam station, about 60 miles of transmission lines, and distribution facilities. The New Mexico Public Service Commission has approved the transaction.

● TWENTY-EIGHT hydroelectric plants, many miles of transmission lines and other engineering works are included in the water development plan outlined in a report on full development of California's Central Valley Basin, prepared by the Interior Department and submitted to Governor Earl Warren and other officials. The report outlines a 15-year program under which the Bureau of Reclamation would complete projects now under construction and undertake multi-purpose developments. Estimated cost is close to two billion dollars, based on 1940 prices.

Better Construction Today—
Less Maintenance Tomorrow



KEARNEY CON-NEC-TITES

Fast, easy-to-use Con-Nec-Tites give positive, permanent solderless line connections. Save time and money.

KEARNEY PROTECTED THREAD CON-NEC-TAP CLAMPS

Line connections stay tight even under severe vibration when you use these small, rugged, corrosive resistant clamps.

KEARNEY TRIP-OUT FUSE CUTOUT

Assure continuous service, positive protection with these reliable switches that save on operating costs. Available in ratings 5000 to 69,000 V. - 100 to 200 Amp.

KEARNEY SAF-T-HOOK CLAMP STICK

Simple to use on all eye-screw type clamps. Safe, because fir poles are tested to withstand 75,000 V. per foot for 5 minutes. Available 4, 6, 8, 10, 12 foot lengths.

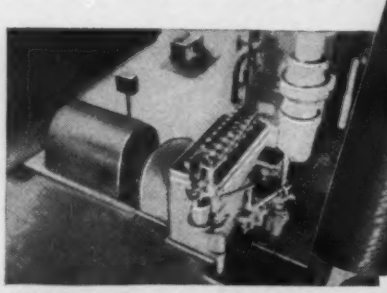
KEARNEY PRODUCTS

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND

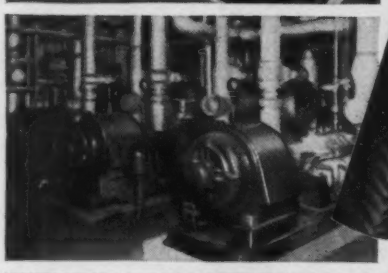
DELTABESTON
Asbestos-insulated Cables
DON'T BAKE OUT

If excessive heat is causing frequent failures in the electrical circuits of your power plant, it's time to rewire with Deltabeston Asbestos-insulated Cables. Deltabeston is used extensively for general power wiring, lighting and control circuits. Power engineers can't afford to speculate with ordinary cables particularly in places where heat is the essential problem. They rely on Deltabeston because they know from experience that despite extremely high ambient temperature, these asbestos-insulated cables don't bake out.

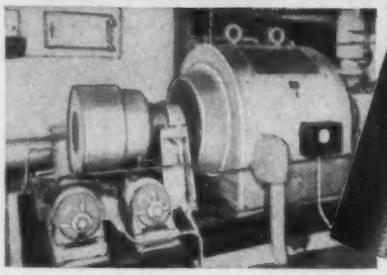
General Electric manufactures a complete line of Deltabeston Asbestos-insulated Wires and Cables for installations where severe operating conditions prevail. There's a cable to meet your most exacting requirements. Here are only a few of the many types.



Deltabeston Power Cable Types AVA for general wiring in power plants, boiler rooms, furnaces and in other torrid zones where constant high temperatures prevail. Insulated with felted asbestos, varnished cambric insert, and asbestos braid or lead sheath.



Deltabeston Boiler Room Wire Type AVA for wiring in boiler rooms, central stations, steel mills and other "hot spots". Insulated with felted asbestos, varnished cambric and asbestos braid.



Deltabeston Apparatus or Motor Lead Wire Type AVA for wiring apparatus in power plants, steel mills, boiler rooms, etc., where flexibility at high heat is desired. Insulated with felted asbestos, varnished cambric and asbestos braid.

For additional information write to Section Y168-18, Appliance and Merchandise Dept., General Electric Co., Bridgeport, Conn. Deltabeston Cables are distributed nationally by Graybar Electric Co., G-E Supply Corp., and other G-E Merchandise Distributors.

GENERAL ELECTRIC

NEW GENERATING UNIT IS SLATED FOR SAN DIEGO

San Diego Gas & Electric Co. will spend $5,750,000 for purchase and installation of a 50,000-kw. steam-electric generator, it was announced last month. This expenditure is in addition to a several-million-dollar improvement program scheduled for 1946 and 1947, according to L. M. Klauber, vice-president and general manager.

The new generating unit, which will be the largest on the company's system, will be housed in an extension to be built on the Silvergate plant, completed in early 1943. It is estimated that the installation will require about 20 months. Boilers of the new unit will be fitted for operation on either natural gas or fuel oil.

Negotiations for purchase of a 50,000-kw. turbine were under way in 1941 but were canceled with the outbreak of war, and this fact gave the company an early priority in face of many postwar demands for equipment, it was stated.

Despite a drastic reduction in use of electric power by San Diego aircraft and related plants, electrical demands have continued to increase, according to company officials, who reported a peak load of 165,000 kw., all-time high, on Nov. 29. It was stated that the new unit will increase the company's service capacity to 232,000 kw., sufficient to supply the area's needs for new homes, commercial buildings and industries.

California-Oregon Power to Buy Additional Properties

Acquisition of all the electric facilities of Public Utilities California Corporation by the California-Oregon Power Co. for $175,000 has been authorized by the Federal Power Commission.

The facilities are located in Del Norte County, Calif., and will require a 25-mile interconnection to reach the purchaser's system. California and Oregon commissions approved the transaction.

● HUGHES ELECTRIC Co. has won the contract for construction of 30 miles of new transmission line in Spokane and Whitman counties, according to V. P. Campbell, Spokane manager for Inland Empire Rural Electrification Inc. The Hughes Electric submitted a low bid of $13,858 on the project, construction of which should be finished in 60 days. The new line will serve between 50 and 60 farms.

Salute to THE ELECTRICAL INDUSTRY

During 1944-45, Union Pacific paid tribute to American industry on its radio program "Your America", broadcast each week over a nation-wide network. Representatives of 70 major industries were given the opportunity to present the dramatic story of their respective industry's contribution to the welfare of the nation.

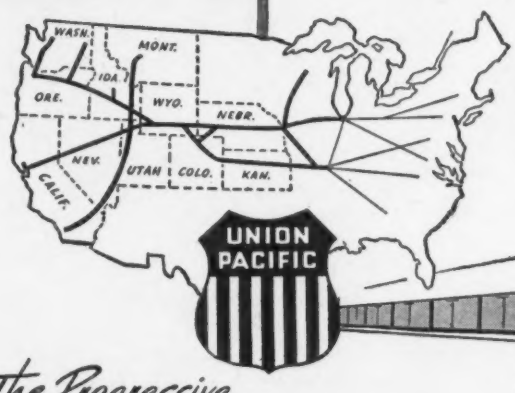
For example, on one program our guest speaker, George B. Cumming of New York City, represented the National Electrical Manufacturers' Association. On other programs were R. C. Cosgrove of Cincinnati, representing the Radio Manufacturers' Association; and Louis C. Upton of St. Joseph, Mich., representing the American Washer and Ironer Manufacturers' Association.

Union Pacific—along with other railroads—was then engaged in moving vital wartime materials. Your industry and the nation generally knows what a tremendous task that was and how efficiently it was accomplished.

Today, Union Pacific is prepared to continue its assistance to your industry by speeding the distribution of peacetime commodities. Equipment, facilities and personnel are geared to provide unexcelled service.

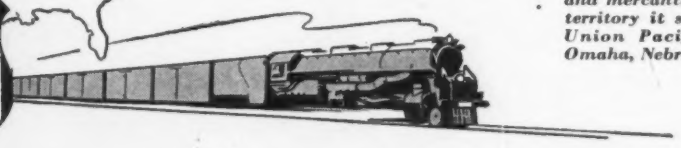
A staff of trained traffic men stand ready at all times to cooperate with you.

For fast, dependable service . . . .



Be Specific—say "Union Pacific"

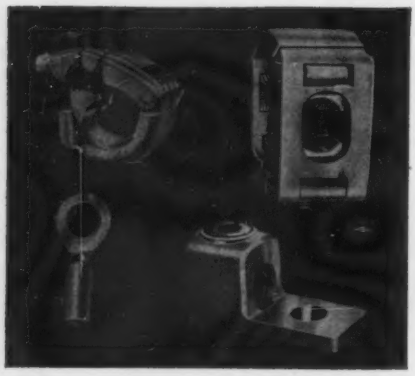
★ *Union Pacific will, upon request, furnish information about available industrial and mercantile sites in the territory it serves. Address Union Pacific Railroad, Omaha, Nebraska.*



The Progressive

UNION PACIFIC RAILROAD

The Strategic Middle Route



BE SURE BEFOREHAND

For your construction, reconversion and production wiring T&B Pressure Connectors are ready and waiting to do a job for you. They are made to handle all types and sizes of wires and cables from #22 up to 1,000,000 CM. Being designed and engineered by pioneer manufacturers of quality electrical fittings, you know in advance just what to expect:

Ease of installation
Speed of installation
Preference over solder by operatives
Perfect electrical connections
Perfect mechanical connections
Uniformity of results
Economy of material
Approvals by Underwriters Laboratories

You can also be sure beforehand that your nearby Electrical Wholesaler carries these T&B Pressure Connectors in stock. We distribute all T&B products through the service organizations of T&B Electrical Wholesalers.

Get in touch with them or write nearest T&B district office for *free samples* of T&B Lock-Tite* Connectors and Sta-Kon* Terminals.**

The Thomas & Betts Co., Incorporated
103 N. Santa Fe Avenue
Los Angeles 12, Calif.

The Thomas & Betts Co., Incorporated
542 Natoma Street
San Francisco, California

Paul Douden & Co.
1645 Wazee Street
Denver 2, Colorado

F. A. Strohecker
301 Eyres Bldg.
2207 First Ave., S.
Seattle 4, Washington

*Trade Mark Reg. U. S. Pat. Off.
**Patented

T&B
THE THOMAS & BETTS CO.
INCORPORATED
manufacturers of electrical fittings since 1898
ELIZABETH, 1, NEW JERSEY
In Canada: Thomas & Betts Ltd., Montreal

PG AND E TO BUILD THIRD SHASTA TRANSMISSION LINE

Pacific Gas and Electric Co. will construct a third 220,000-volt transmission line to carry Shasta Dam power into the San Francisco area, according to announcement of President James B. Black. The line will cost approximately $6,000,000.

A new steel-tower line will be built on company right-of-way between the dam and Vaca-Dixon substation in Solano County. A new 220,000-volt circuit will be added on existing tower lines between Vaca-Dixon and Contra Costa substations and from there to Newark substation at the lower end of San Francisco Bay. Work is under way and will be completed in 1946.

A Congressional House committee recently refused to approve a USBR request for funds for a power line from the dam. At a hearing last October, Black pointed out that by making use of existing facilities, PG and E could do for $25,000,000 what the USBR contemplated doing for $68,000,000 plus. "If you exclude the cost of the steam plant, we can transmit the balance of Shasta power and get it to market for a capital cost of about one-half that of the bureau. If you include the steam plant, we can do it for about one-third of the cost to the bureau," he told the Congressional subcommittee on appropriations.

● MARKING a definite start on the Campbell River power development program of the British Columbia Power Commission, tenders were called last month by the B. C. government-owned concern for erection of an 85-ft. dam at Campbell River, together with water conduits and power house. Bids have also been invited for the clearing of the 95-mile right-of-way for the transmission line from Campbell River to Nanaimo.

B. C. Electric Studying Fraser Valley Expansion

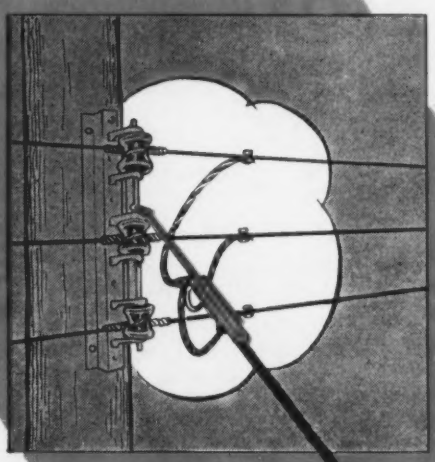
Involving the expenditure of $1,000,000 and covering a period of five years, a new program for the complete reorganization of the transmission, distribution and substation facilities in its Fraser Valley territory has now been announced by the B. C. Electric Railway Co. It is estimated that between $200,000 and $300,000 will be spent on the new project in 1946.

Ingledow states the project will care for any increase in population, or agricultural or industrial development, and added that districts where the greatest growth had taken place would get priority.

Low voltage conditions existing in certain areas, particularly around Sumas and Chilliwack, will be taken care of with temporary measures to step up the power pending completion of the new grid system.

● FEATHER FALLS ELECTRIC Co-op (Idaho) has received $110,000 in REA funds including money for acquisition of ten miles of existing line.

To make more water available for hydro generation at its Big Creek project, Southern California Edison Co. last month finished a small creeks diversion project to divert flow of Hooper, Slide, Tombstone and Bolsillo creeks into Florence Lake and Ward Tunnel. Above, excavation is made for the pipe line, 13,230 ft. long, just below the Hooper Creek Dam site. It is estimated that the diversion will supply water for generation of between fifty-one and fifty-two million more kilowatt-hours of electrical energy



CHECK THE 6 POINTS BEFORE SPECIFYING...

CONCENTRIC CABLE CLAMPS

WRITE FOR NEW PRICE SHEET GI-DATED 9-45

1 Cable can be cut to accurate length after being sagged—eliminating waste.

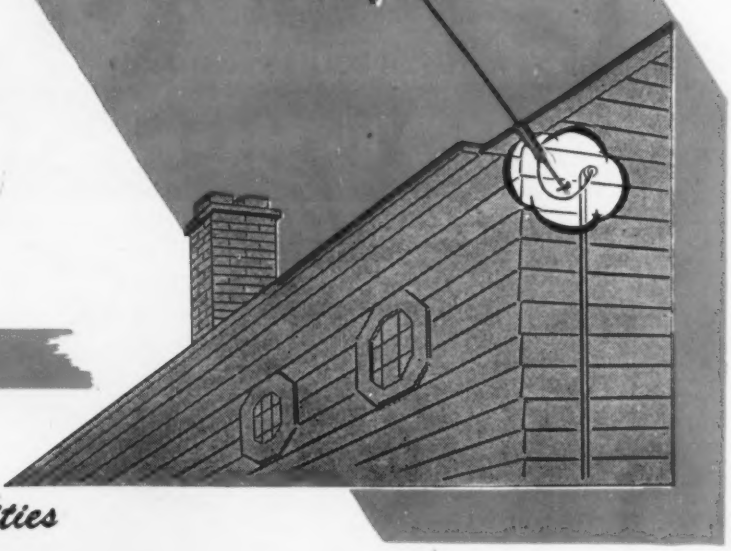
2 Large clamping area grips without distorting or damaging cable.

3 Wedge design tightens grip on cable as tension increases.

4 Made entirely of non-corrosive alloys of high copper content.

5 Easy to install—does not need to be threaded.

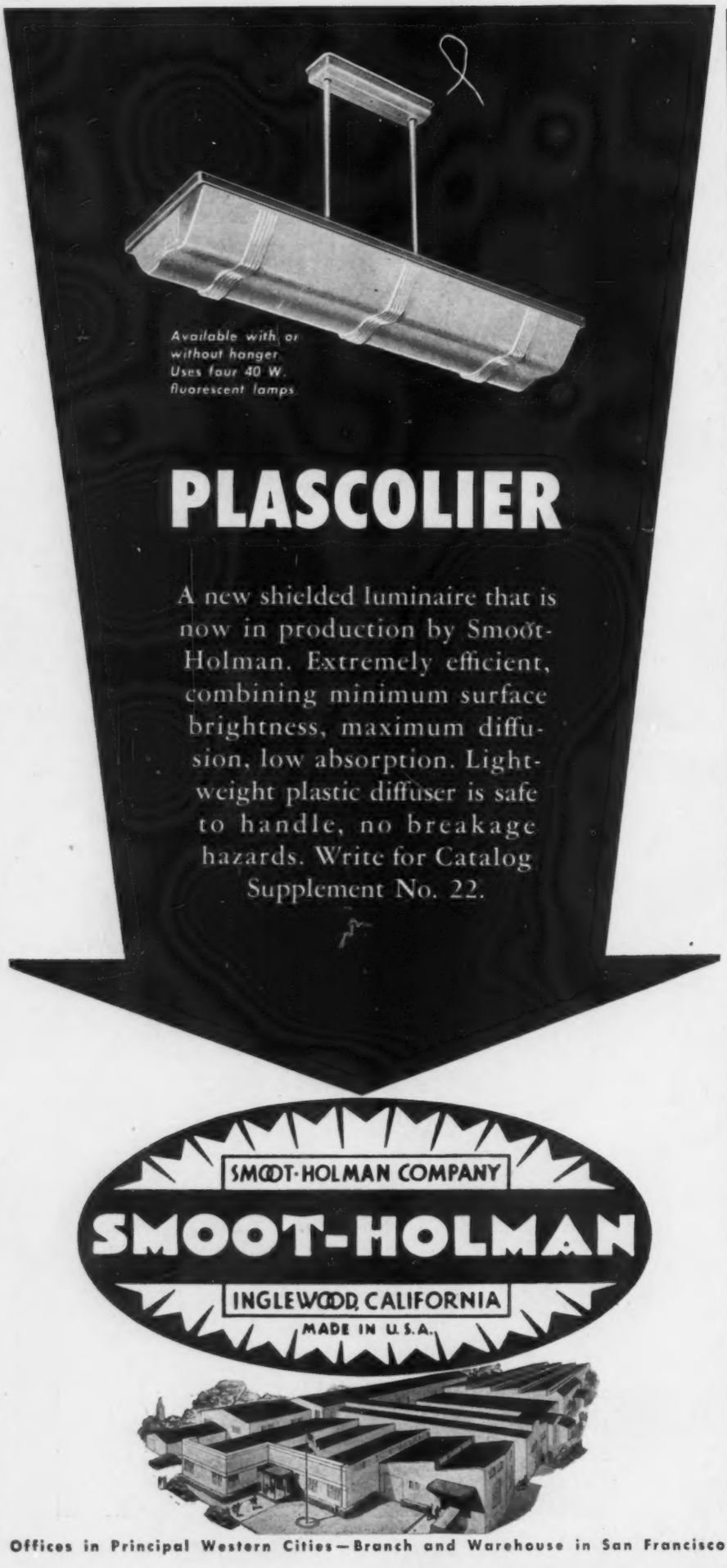
6 Available for all popular round or oval service cable sizes.



Reliable

ELECTRIC COMPANY
3145 CARROLL AVENUE
CHICAGO 12

35 Years Service to the Utilities


Available with or without hanger. Uses four 40 W. fluorescent lamps.
PLASCOLIER
A new shielded luminaire that is now in production by Smoot-Holman. Extremely efficient, combining minimum surface brightness, maximum diffusion, low absorption. Lightweight plastic diffuser is safe to handle, no breakage hazards. Write for Catalog Supplement No. 22.
SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.
Offices in Principal Western Cities—Branch and Warehouse in San Francisco

SEATTLE PLANNING BIG CONSTRUCTION PROGRAM

Seattle City Light will undertake a $1,100,000 development program, to strengthen its distribution system throughout the city's metropolitan area. Largest single construction program in City Light's history, the work probably will require two years, due to material shortages, according to Superintendent E. R. Hoffman.

Plans call for installation of seventeen 3,000-kva. substations, costing about $39,000 each. This will increase the number of such substations from seven to 24. The program also calls for construction of some 55 miles of distribution and sub-transmission lines and substation feeder ties and supply lines.

Hoffman said that residential power consumption has more than doubled during the past five years, with the annual average use jumping from about 1,700 kwh. to approximately 3,600 kwh. This, coupled with an increase of about 10,000 customers during the same period, places the city's municipally owned system in the billion kilowatt-hour per year class and represents 80% increase in peak loads since 1941.

Albuquerque Company Has $215,000 Improvement Plan

Plans of the Albuquerque Gas & Electric Co. to expand its electric service in Albuquerque, N. M., at an outlay of $215,000, were announced recently by President Arthur Prager, following a trip to New York.

Work will consist mainly of rebuilding many of the company's overhead distribution lines and addition of a 6,000-kw. and a 2,000-kw. substation.

The company expects to purchase electric power from the Elephant Butte plant, 150 miles away, when the government can make delivery to Albuquerque. A bill for construction of a section of the power line is before Congress. However, Prager commented that the city's share of the power would be "very small for three or four years."

● A $56,880 CONTRACT for construction and equipment to be used for work on the Columbia River channel at Grand Coulee Dam has been awarded to the Washington Iron Works, Seattle.

● LOST RIVER Electric Co-op has awarded a $5,013 contract to the Olson Construction Co., Salt Lake City, for labor on the conversion of 22 miles of line.

INCENTIVES FURNISH THE DRIVE

THE COMING YEAR, 1946, and the years to follow can bring unprecedented prosperity to the people of the United States if the incentives to secure it are provided.

We have the advantage of starting with an economy which has demonstrated a capacity for expansion unequalled in any other country in the world. Our economy has demonstrated, also, one grave weakness—a recurring interruption of the upward trend of production and living standards by wasteful and paralyzing periods of recession. Recovery from each depression always has carried us to new heights of economic welfare, but the toll of the years of blight has been harmful to everyone.

The job ahead of us is a dual one. We must maintain the vitality of an economy which, over the years, has yielded an enormous increase in the American standard of living, and we also must improve its stability.

The Dynamics of American Production

In the last prewar year, 1940, the population of the United States was 3⅓ times as large as it was in 1870. But the national production, measured in dollars of constant purchasing power, was 10 times as large at the end of the period, and industrial output had increased 20-fold.

In the meantime, the average number of hours of factory workers had been reduced from about 63 per week in 1870 to less than 40 in 1940, while average hourly earnings had more than trebled in dollars of constant purchasing power. Thus "real" weekly or annual wages in manufacturing had doubled over the 70-year period, even though the work-week was cut by 35 per cent. This was made possible chiefly by a tremendous increase in the quantity and quality of the mechanical facilities which were provided in American manufacturing industry. Manufacturing capital investment per worker was multiplied by 6 times over the period in question. But the return per dollar invested, while it has fluctuated widely between good years and bad, showed no general upward trend over that portion of the period for which measurement is practicable.

Incentives in American Manufacturing

There has been, historically, a remarkably consistent pattern in the division of the realized income from the expanding manufacturing output of America. Reliable statistics are not available for as far back as 1870, but from 1899 through 1939 the average share of wages and salaries has been 82½ per cent against 17½ per cent as the share to investors (including dividends, interest, rents, royalties, and non-corporate profits). There have been, from year to year, relatively minor divergences from this pattern of distribution, but there is no discernible trend during the period away from the averages cited.

It is suggested that the persistence of the average 17½ per cent share of realized income from manufacturing that was maintained for the 40 years preceding World War II may represent the proportion that is needed to produce the dividends, interest, rents, royalties, and non-corporate return that will provide for the continuing investment upon which an expanding productivity such as we have had in the past depends. At any rate, it would seem reckless to depart too radically from such an established pattern at a time when unprecedentedly large private capital investment is counted on to make up for the drastic curtailment of such investment during the war years, and to carry us to the new high levels of civilian production set as our postwar goals.

The Distribution of Manufacturing Income in War

At the beginning of the war, the Government adopted controls and a tax program designed to prevent wartime activity from resulting in un-

duly swollen private returns. Due primarily to huge volumes, the profits *before* taxes of manufacturing industry were very high, but throughout the war its profits *after* taxes averaged returns no larger than they had been in good prewar years. Relative to volume, they were considerably lower than in prosperous years in the past. Again, there can be no complaint at results that generally were in accord with a national wartime policy.

But it is fair to note that the wages of manufacturing labor were allowed to increase substantially during the war. Between January 1, 1941 and April, 1945, average weekly earnings per worker increased by 77 per cent. This was, in considerable part, a result of increased working hours and a shift from low- to high-paid industries, but straight-time hourly earnings on the same jobs increased about 40 per cent against a cost-of-living rise of about 30 per cent.

The net result was to alter drastically the 40-year relationship of the 17½-82½ per cent division of Realized Income from Manufacturing. The share of wages and salaries increased to over 90 per cent, and the investment share shrunk to less than 10 per cent.

Its Postwar Distribution

This wartime shift in the proportion of distributive shares has an important bearing upon current wage controveries. With union demands for wage increases ranging up to 30 per cent, and the economists of the Office of War Mobilization and Reconversion asserting that an average increase of 24 per cent is feasible without raising prices, it is pertinent to inquire how such increases would affect the prewar ratios that governed realized income distribution in manufacturing.

Forecasting is always hazardous, but if we assume (1) that in 1946 we shall reach the $160 billion level of national output which the Government proponents of general wage increases expect, and (2) that there will be little increase in productivity because of the continuing process of reconversion, and (3) that the Government will succeed in carrying its announced purpose to maintain present price ceilings, it appears that a 24 per cent general wage increase would reduce the share going to capital from 17½ per cent to 11 per cent even allowing for its increased return resulting from the repeal of the excess profits tax. The prewar ratios would be about maintained if wages remained at present levels.

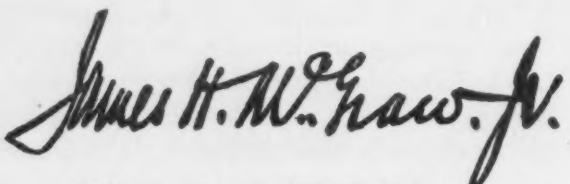
Conclusion

Since the maintenance of these prewar ratios was accompanied by an unparalleled rise in the "real wage" of American workers, there is a powerful prima facie case for not tinkering with them. It should be noted, however, that some economists think that the size of the investment share of manufacturing income tends to provide more capital than can be absorbed by a mature economy, and thus contributes to those breaks in the expansion of the economy which, as stated at the outset, have been its principal blight.

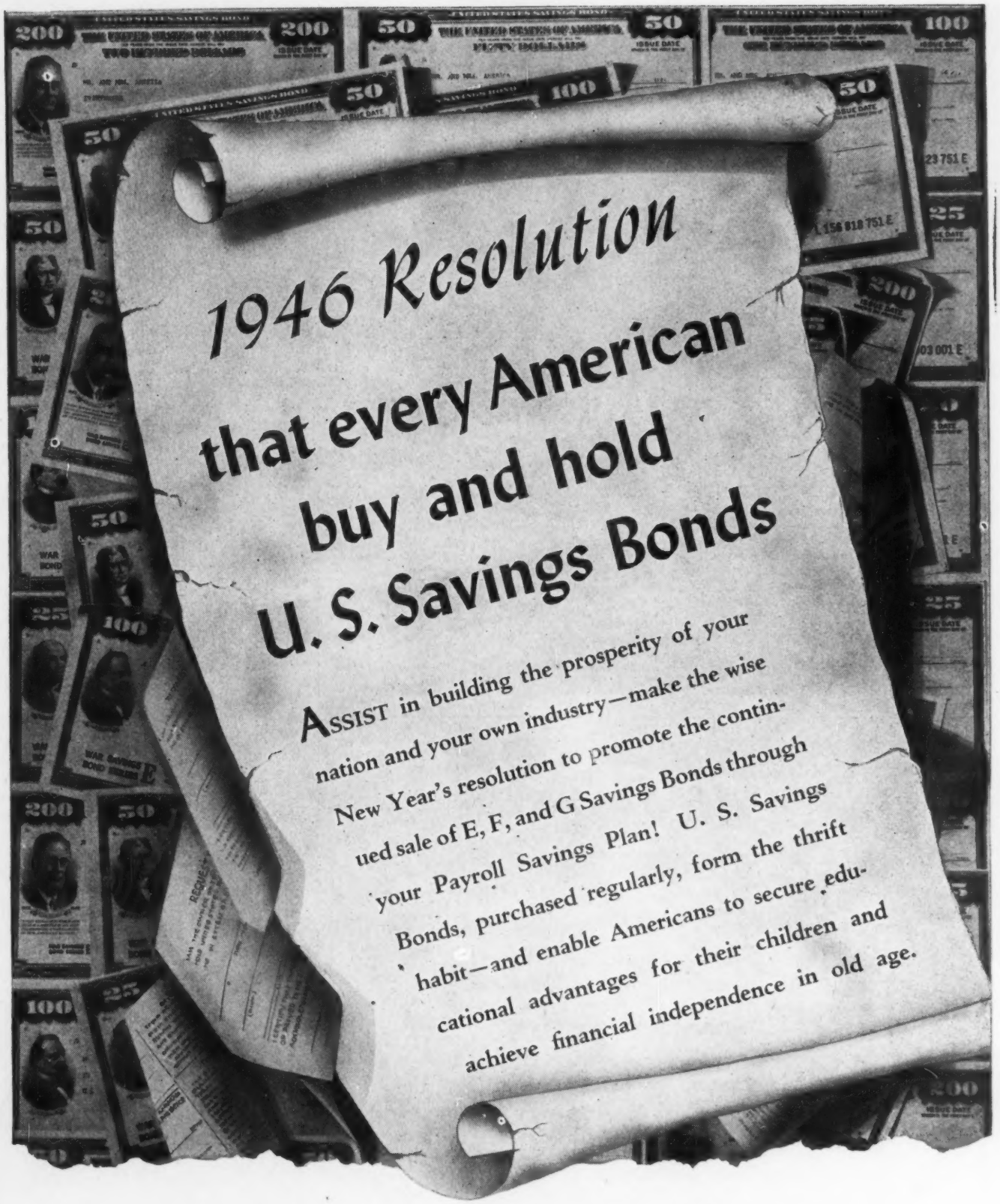
Regardless of what may ultimately prove to be the validity of this view, no one can responsibly contend that at this early but crucial stage in the reconversion process is the time to test it. Now, no one knows whether, or what dimension of, additional wage increases can be supported without forcing up prices or reducing profits to a point that will discourage vitally needed private capital investment.

We want high and increasing wages in American manufacturing. We need them to provide an active incentive to workers to support expanding productivity, as well as to continue the trend of rising living standards in America. Equally, we need a continuing profit incentive of sufficient attractiveness to call forth the new investment upon which expanding productivity depends.

We can never attain our dual objective if we push one of these aims so far and so fast that it defeats the other.



President, McGraw-Hill Publishing Co., Inc.

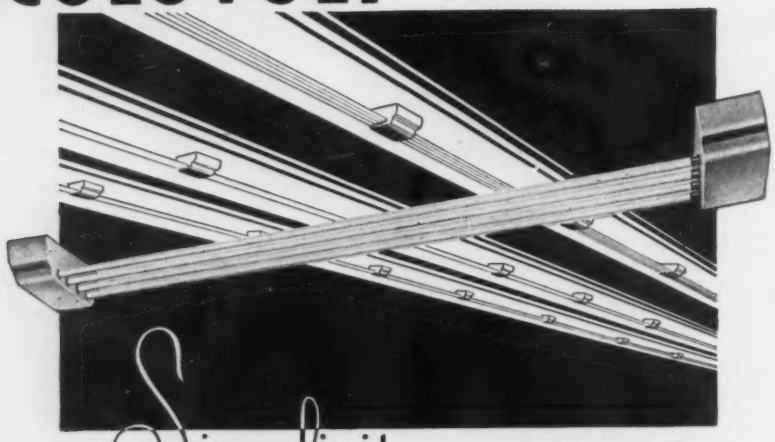

1946 Resolution
that every American
buy and hold
U. S. Savings Bonds
ASSIST in building the prosperity of your nation and your own industry—make the wise New Year's resolution to promote the continued sale of E, F, and G Savings Bonds through your Payroll Savings Plan! U. S. Savings Bonds, purchased regularly, form the thrift habit—and enable Americans to secure educational advantages for their children and achieve financial independence in old age.

The Treasury Department acknowledges with appreciation the publication of this message by

ELECTRICAL WEST

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and War Advertising Council

*COLOVOLT



Simplicity LIGHTING UNITS

Cold Cathode Low Voltage

Long continuous lines of light, possessing all the recognized advantages of Colovolt Cold Cathode Fluorescent illumination, come to you in these "Simplicity" assemblies. Distinctive in design—easy to install—simple to maintain—no gingerbread attachments—no dust collecting areas—"Simplicity" units give balanced illumination with comfortable, easy-to-look-at light for every commercial installation. Units available to make individual 8 foot fixtures or continuous line lighting in multiples of 8 feet. Colovolt 93" 10,000 hour lamps (1) are guaranteed for 1 full year except for failure due to breakage, (2) require no starters—do not flicker, (3) are practically free of intermediate burn outs.

Contact your electrical wholesaler or jobber, or write us for full details and prices.

* Trade mark registered U. S. Pat. Off.

General LUMINESCENT CORPORATION

GENERAL LUMINESCENT CORPORATION

670 So. Federal St. CHICAGO 5, ILL.

$ Savings + Protection!

WITH THIS FAMOUS

TRICO REG. U. S. PAT. OFF. COMBINATION

TRICO RENEWABLE FUSES with the "different" powder-packed, time-lag, non-interchangeable and tamper-proof element, guarantee you maximum efficiency and dependability. You get THREE TIMES THE SERVICE . . . at NO ADDITIONAL COST.

TRICO KLIPLOK CLAMPS literally bolt fuses and clips together supplying the necessary contact for maximum results.

Write for Bulletins No. 1 and 6

COAST REPRESENTATIVES

H. H. Van Luven - - - - Los Angeles
Hughson & Merton - - - San Francisco
Albert S. Knight - - - - - - - Seattle
W. E. Young Co. - - - - - - - Denver

TRICO FUSE MFG. CO.

MILWAUKEE WISCONSIN

500-KV. TRANSMISSION WILL BE STUDIED

Transmission at voltages ranging from the present maximum of 287 kv. up to 500 kv. is about to be investigated in a project initiated by American Gas & Electric Corp. Nine leading manufacturers of conductors, insulators and equipment are participating.

Two 1½-mile, three-phase transmission lines are to be erected for test purposes adjacent to the Ohio Power Co.'s Tidd generating station at Brilliant, Ohio. Appalachian Electric Power Co. and Indiana & Michigan Electric Co., the other two principal companies of the Central System, will participate.

While transmission at voltages up to 500 kv. is technically feasible, specific information as to construction and operating costs is incomplete. The Ohio investigations will center around corona loss, radio interference and insulation coordination with the purpose of developing authentic data concerning the most economical design for transmission of large blocks of power.

● BIDS have been called for four or six electric pumps at Grand Coulee Dam to provide irrigation for the first 400,000 or 600,000 acres to be irrigated. Each pump will be driven by a 65,000-hp. motor and will be capable of lifting 100,000 lb. of water a second to a height of 270 ft. Ultimately 12 pumps will be installed at the dam, at a total estimated cost of $31,000,000. Water will be forced from Lake Roosevelt, reservoir formed by Coulee, up over a hill and into the dam itself, forming a 27-mile lake from which water will flow by canals. Bid call is for pumps only; drive motors will be purchased later under a separate contract.

● A DIFFERENTIAL ANALYZER has been purchased from General Electric Co. for installation on the Los Angeles campus of the University of California. The instrument, sixth of its kind in the United States, will be housed in the University engineering laboratories to be built soon. It was pointed out by Dean L. M. K. Boelter of the University College of Engineering, that the instrument will be available to the entire state for solution of industrial and scientific problems, such as those involved in heat transfer, electrical circuits and engine vibration.

● COPIES of the latest in Bonneville's economic surveys, dealing with power markets in Clallam and Jefferson counties, Wash., are available at BPA's Seattle district office or from its Portland headquarters.

OVERHEAD CONNECTORS

BACKED WITH PROVED PERFORMANCE...BOTH RURAL AND URBAN

Long, practical experience counts—whether it's building overhead lines or connectors! That's why line builders bank on Burndy for overhead connectors like those shown here. There's years of *practical experience*, and *proved performance*, back of every one. Let us acquaint you with the complete Burndy line. Write . . . Burndy Engineering Company, Inc., 107-V Bruckner Boulevard, New York 54, N. Y,

Headquarters for CONNECTORS

Burndy

1 SERVIT* (Type KS) Forged for High Strength. For Copper and Copper-weld conductors. 13 sizes take from No. 10 solid to 1000 Mcm. Also, available for aluminum conductors.

2 SERVIT* (Type KSAKF) For aluminum to copper connections. Consists of High Strength aluminum Servit with bimetallic Copral washers to keep similar metals in contact.

3 ARMOR ROD CLAMP (Type BPG) For tapping from a run of ACSR protected by armor rod. Has strong spring pressure plate to keep conductors under constant pressure.

4 UNIVERSAL CLAMP (Type UC) Accommodates a large range of cables and wires in either groove. Available in 6 sizes to handle from No. 6 solid up to 1000 Mcm.

5 TAP CONNECTOR (Type KVS) Strong, compact, quickly installed. Multiple bolts for high contact pressures. Five sizes take from No. 4/0 Str. to 1000 Mcm.

6 GROUNDEM (Type GH) An economical, non-corrosive ground clamp for driven rod or pipe. Slipped over top of rod or installed from the side.

7 HOTTAP* (Type HTE) A well balanced hot-line tap for low-cost work. Eye-bolt fits standard hot-line sticks. Available for copper or aluminum conductors. Also heavy duty types.

8 REDHEAD* (Type HR) Completely insulated live-line jumper clamp for use in pairs with a flexible connecting cable for shunting equipment.

9 BUTTIN* (Type KP) Compact, inexpensive; ideal for making connections between service drop conductors and entrance leads.

*Registered Trade-Mark

TURN ON THE HEAT *when and where you want it . . . with NICHROME

From keeping aerial cameras warm in the stratosphere to protecting delicate roots underground, Nichrome heating elements have been impressed into service to deliver dependable heat . . . wherever and whenever it is required. Because the vital factor of dependability leaves no room for compromise Nichrome has been specified for more new electrical heating applications.

Although there are several excellent Nickel-Chromium combinations there is only one NICHROME and it is made only by Driver-Harris. For improved performance in your new products, specify Nichrome and other resistance alloys by Driver-Harris. Tell us what you need.

*Trade Mark Reg. U. S. Pat. Off.

Driver-Harris COMPANY

Stocked for the Coast Trade at ANGUS-CAMPBELL, INC.

235-241 San Bruno Ave., San Francisco • 449 So. San Pedro St., Los Angeles • 2122-4th Ave., Seattle

Main Office and Plant: HARRISON, NEW JERSEY

DEPEND ON—INSIST ON—

P.R. MALLORY & CO., Inc.

MALLORY CAPACITORS

Necessary leads, lugs, screws, and nuts are included in each box for any type connectors.

Mallory MSG Capacitor:—Small, compact AC Motor Starting Capacitor that fits almost every mounting bracket or box. Replaces rectangular capacitors with leads, lugs or studs. Each capacitor is packed with complete set of universal mounting hardware and installation instructions.

Distributed by

INSULATION AND WIRES INCORPORATED
SAINT LOUIS 3, MISSOURI

BOSTON 20, MASS. · DETROIT 2, MICH. · ATLANTA 3, GA.
HOUSTON 2, TEX. · BLUEFIELD, W. VA. · NEW YORK 7, N. Y.

SITTLER COMPANY
CHICAGO 7, ILL.

H. A. HOLDEN, INC.
MINNEAPOLIS 3, MINN.

W. C. JOHNSON COMPANY
PEORIA 5, ILL.

TRI-STATE SUPPLY CORPORATION
LOS ANGELES 13, CAL. • SAN FRANCISCO 7, CAL. • SEATTLE 4, WASH.

TWO OREGON COUNTIES FILE PUD PETITIONS

Petitions for two PUDs in northern Oregon were filed with the state hydroelectric commission last month.

One district would embrace 63 square miles, including several coastal communities in northern Lincoln County. The district would have an assessed valuation of $785,000 and would serve about 3,000 customers.

The second district would include most of Marion County outside Salem. This territory contains 842 square miles, has a 40,000 population and an assessed valuation of $23,000,000.

PUD Supporters Promote Clatsop County District

In Clatsop county, Ore., petitions are being circulated proposing the establishment of a PUD to include the incorporated cities of Astoria, Gearhart, Seaside and Warrenton, together with rural areas.

The property valuation in the district is estimated at $11,000,000. Sponsors of the movement include labor unions, granges, and other organizations.

A similar proposal was defeated by voters of the area in 1941.

● SUIT has been filed in Superior court at Vancouver, Wash., by four property owners, asking that recent action by the Clark County PUD in closing a deal with the Ballard-Hasset Co. of Des Moines, Iowa (ELECTRICAL WEST, December, p. 132), be adjudged unlawful and void. The PUD's plan for floating a $1,000,000 bond issue with Ballard-Hasset to finance acquisition of properties of the Portland General Electric Co. may be blocked on the property owners' allegation that the utility failed to ask for bids on the issue. The PUD had planned to take over PGE properties in Clark County January 1.

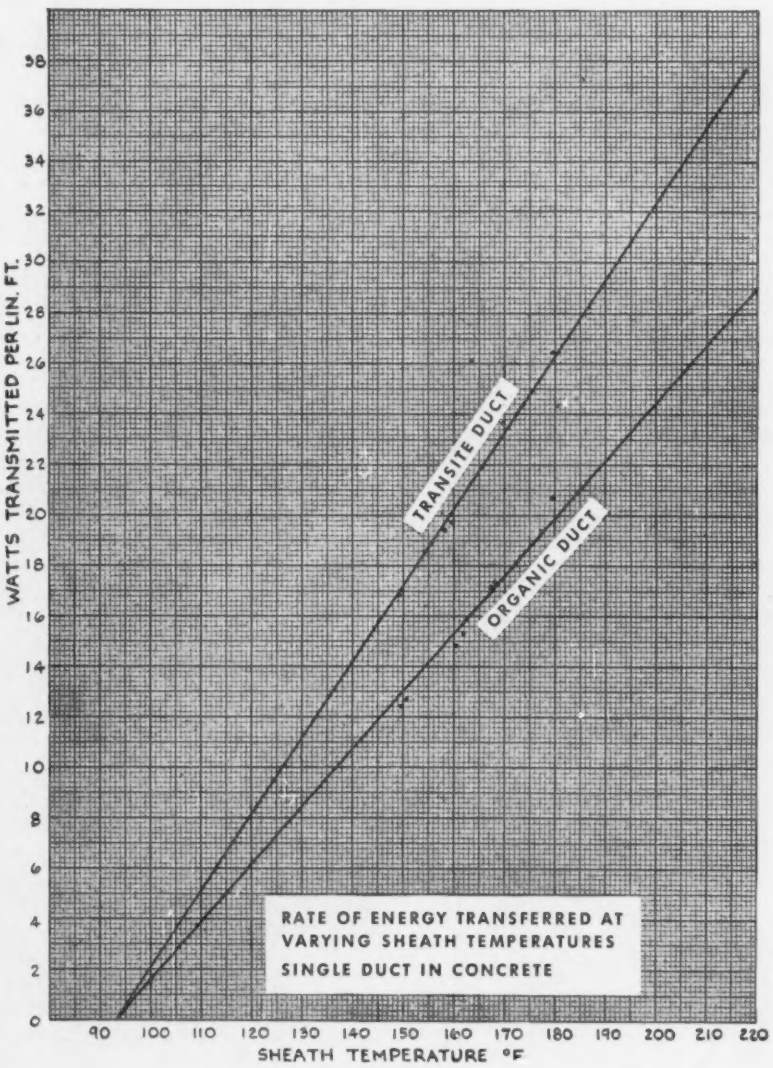
● IN COLORADO, REA funds were allocated to Intermountain Rural Electric Assn. ($150,000); Mountain View Electric Assn. ($193,000); Sangre de Cristo Electric Assn. ($70,000); Southeast Colorado Power Assn. ($114,000).

● CLALLAM COUNTY PUD (Wash.) was awarded $370,000 in REA funds, including an appropriation for construction of 52 miles of line.

● DIXIE RURAL ELECTRIC Co-op, St. George, Idaho, received $38,000 in REA funds for purchase and rehabilitation of 2.75 miles of existing line.

Cooler Cables

proved in the laboratory and in operation with Transite Ducts



AS THE GRAPH shows, Transite Ducts made of asbestos and cement have a much higher rate of heat transfer than organic conduit. Tests in the Johns-Manville Laboratories, later applied to specific field conditions, proved that Transite Ducts dissipate I_2R losses 13% faster than other ductways tested, thus keeping cables cooler.

In actual operation, this means that cables installed in Transite Ducts have a higher inherent load capacity, or, carrying rated loads, will run cooler, thereby reducing copper losses and increasing cable insulation life.

Transite Ducts, made of asbestos and cement, are strong, immune to rust and rot. They are incombustible and unaffected by electrolysis or galvanic action. A permanently smooth bore makes possible long cable pulls and easy replacements. Long, lightweight lengths can be quickly and economically installed. In addition, a variety of fittings simplifies even the most complicated installations.

For full information write for Data Book DS-410: Johns-Manville, 22 East 40th Street, New York 16, N. Y.

The chart shows why Transite Ducts keep cables cooler than ordinary organic ducts.

Johns-Manville

TRANSITE DUCTS

CONDUIT for use without concrete

KORDUCT for concreting in

JOHNS-MANVILLE JM PRODUCTS

TUCSON CUSTOMERS GIVEN ELECTRIC BILL REFUNDS

Customers of Tucson Gas Electric Light & Power Co., received $500,000 and Central Arizona Power Co. customers about $482,000 in refunds ordered by the Arizona Corporation Commission. Investigation of rate schedules in Arizona followed legislative appropriation of $50,000 for the purpose.

Central Arizona Light & Power waived payment of December bills, instead of making a cash refund.

E. H. Coe, president, and A. F. Moriarty, vice-president, stated that the company would start rate studies at once to reduce charges on electricity during the coming year.

● To RELIEVE a housing shortage at Grand Coulee Dam, the USBR has purchased several dozen one-room trailers and will establish a temporary settlement on the east bank of the Columbia River below the dam. The trailers formerly were occupied by workers at the Hanford atomic bomb plant.

● PUGET SOUND Power & Light Co. received the Socrates Honorable Award Certificate for "outstanding newspaper advertising performance in the public utility field." The award was made by the board of judges of Public Utility Ad-Views and the Vincent Edwards publications and was for 1944 advertising.

● UNION Rural Electric Assn., Brighton, Boulder County, Colo., has received $117,000 from REA loan funds, including $34,500 for substation installation and line conversion. A $64,741 grant was awarded to STONEWALL Electric Co., Trinidad, Colo.

● TO PROVIDE quarters for expanding personnel, Bonneville Power Administration will build a four-story $600,000 office in Portland. Of steel and concrete, 100 by 190 ft., it will be erected by Lloyd Corp., Ltd.

● EL PASO, Tex., Electric Co. has announced a proposed reduction in rates to residential customers totaling $147,687 a year. The reduction, subject to approval by the city, was effective Jan. 1.

T. A. Purton, Utah Power & Light Co. chief engineer, in diving suit, ready for his first experience as a deep sea diver. He went 25 ft. under the surface of the Snake River to view damage to the company's Ashton plant. The concrete tailrace apron had been undercut by backwash to a distance of 12 ft. back and 4 ft. deep, extending the full 200-ft. width of the tailrace and leaving the apron suspended in the water without support. Divers built a wall to serve as a coffer dam, through which grout pipes will be inserted to fill the area behind with cement. With Purton are, from left, E. A. Hewitt, director of safety and first aid; C. L. Lieser and Fred Haines, diver's tenders; J. F. Woolley, supt. of maintenance and construction, L. C. Smith, diver

PG AND E SETTING UP RETIREMENT TRUST FUND

Pacific Gas & Electric Co. will set up a $13,600,000 trust fund for employee retirement incomes. This is in addition to a previous retirement insurance plan established by the company early in 1937.

The trust funds, which will be invested initially in PG and E's first and refunding mortgage, 3%, bonds, are secured by a mortgage on all the properties of the company.

Beginning July 1, all company employees will be required to retire at their normal retirement dates. Those working at present who are beyond their retirement dates will be retired sometime between now and July 1. A proviso, however, indicates that special cases will be determined individually in order to re-employ anyone so retired at a compensation.

Agreements to Increase Wiremen's Wage Rate

New agreements have been made between IBEW locals and contractors associations in northern California. Wiremen will receive $2 per hour on a basic seven-hour day, with a slightly changed overtime wage scale, under the contracts which will be effective when approved by the Wage Adjustment Board or when federal controls are lifted, whichever occurs first.

The raise represents a 17.6% increase over the former $1.70 hourly pay, and is expected ultimately to take in all the West Coast.

Agreements also are pending with neon sign shop contractors, setting up a $2 hourly scale for neon electricians and tube benders and $1.50 an hour for neon service men.

● PORTLAND GENERAL ELECTRIC Co. has offered 14 scholarships to the 1946 summer school term at Oregon State college for 4-H club members, the awards to be made to one boy and girl in each of the seven Oregon counties in PGE territory. The scholarships will be joint prizes to the Westinghouse Electric Corp.'s 1946 better farm and home methods electric contest for national 4-H club members.

● A 15% WAGE INCREASE, retroactive to the middle of August, has been awarded the employees of San Diego Gas & Electric Co. The increase, announced Dec. 13, will affect both union and office workers. According to the utility's officials, the increase will amount to approximately $450,000 annually.

CROUSE-HINDS

Plugs and Receptacles

The illustrations show a representative selection from the hundreds of different electrical plugs and receptacles that are listed in Crouse-Hinds CONDULET Catalog No. 2500. A full range of sizes — 10 amperes to 400 amperes, up to 600 volts A. C.

No. 5

of a series of advertisements which demonstrate that CROUSE-HINDS "complete line" means much more than just a range of sizes — there is a wide variety of highly specialized types in each classification.

Type C Condulet with Double T Slot Receptacle

Type C Condulet with Receptacle

Type DXE Condulet with Twist Lock Receptacle

Type FS Condulet with Pilot Light, Switch and Receptacle

Type FS *Two-gang Tandem* Condulet with Switch and Receptacle

Type FSC Condulet with Type BRD Receptacle and Plug

Type BRMF Receptacle Condulet for Flush Mounting with Plug

Type BRME Receptacle Condulet

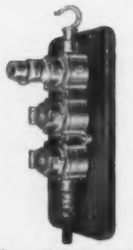
Type BRM Receptacle Condulet with Plug

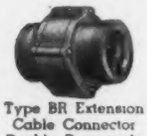
Type FS Weatherproof Receptacle Conaulet with Locking Cover

Type FSC Receptacle Condulet with Three Receptacles and a Watertight Plug

Type FS Condulet with Type FAR Arktite Receptacle

Type PRB Receptacle Condulet with Five Receptacles


Type GSP Portable Receptacles with Plug *Three-Gang*


Type BR Extension Cable Connector Double Receptacle

Type BRC Extension Cable Connector Receptacle and Plug

Type ARE *Arktite* Receptacle

Type AEQ *Arktite* Receptacle *for Flush Mounting*

Type AJRC Condulet with *Arktite* Receptacle

Type BRW Watertight Double Receptacle Condulet with Plug *for Railroad Yards*

Type ARD Condulet with *Arktite* Receptacle

Type WMKS Interlocking Safety Switch and Receptacle

Type AJ Condulet with *Arktite* Receptacle

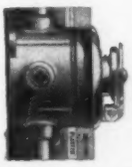
Type GST Condulet with Type BRG Receptacle and Plug

Type QEEH Delayed Action *Arktite* Receptacle

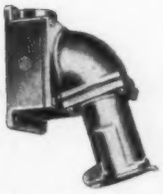
Type APC *Arktite* Extension Cable Connector

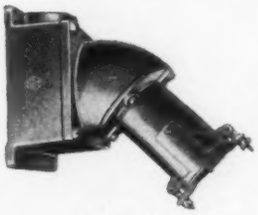
Type AREX *Arktite* Receptacle

Type APF Fusible *Arktite* Plug, Exploded View


Adjustable Type EHS Explosion-Proof Delayed Action Receptacle Condulet

Type AEQ *Arktite* Receptacle for Flush Mounting, *Two-gang*


Type AREA *Arktite* Receptacle


Type AREA *Arktite* Receptacle

Type FSQ Explosion-Proof Interlocking Receptacle and Switch

Type CES Explosion-Proof Delayed Action *Arktite* Receptacle

Type CPS Explosion-Proof Delayed Action *Arktite* Receptacle with Plug

Type CPS Explosion-Proof Delayed Action *Arktite* Receptacle, *Two-gang*

Type FSQC Explosion-Proof Interlocking Receptacle and Switch

CROUSE-HINDS COMPANY

Syracuse 1, N. Y., U.S.A.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — San Francisco — Seattle — St. Louis — Washington. *Resident Product Engineers:* Albany — Atlanta — Charlotte

CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS

HELPING ELECTRICITY SERVE AMERICA BETTER!

BETTER WIRE JOINTS

with IDEAL "WIRE-NUTS"
(Solderless, Tapeless Wire Connectors)

In the electrical wiring of factories, homes, public buildings, etc., leading electrical contractors are using millions of IDEAL "Wire-nuts" because they make wire joints that are neater, safer, quicker, better electrically—stronger mechanically. IMMEDIATELY AVAILABLE . . because no critical material used. Approved by Underwriters' Laboratories, Inc.

Other IDEAL WIRING DEVICES

Today and Tomorrow thousands of new wiring jobs in Industrial Plants and in construction will be facilitated with IDEAL Wiring Devices:—

E-Z Wire Strippers
Lugs, Solder and Solderless
Fish Tape Reels and Pullers
Joist Boring Machine

SOLD THROUGH JOBBERS
PROMPT DELIVERY

IDEAL Sycamore
IDEAL COMMUTATOR DRESSER CO.

WEST COAST WAREHOUSE STOCKS.
Stribly & Barton, Ltd., 912½ E. Third St., Los Angeles, Cal. F. M. Nicholas Co., 1123 Harrison St., San Francisco, Cal. L. S. Foley, 131 S.W. 4th Ave., Portland, Oregon. Northwestern Agencies, 2411 First Ave., Seattle, Wash.
Sales Offices in all Principal Cities

STEEL STRAND

Crapo GALVANIZED PRODUCTS

ALL the strength and durability inherent in steel are combined---with definite economies---in Crapo Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of Crapo Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

F.H.A. LOANS
TO BUY—
REMODEL—
REFINANCE

Long-term and low-cost F. H. A. loans are still available to finance the purchase of homes already built. Monthly payment F. H. A. loans for buying or refinancing homes are made by this bank for as much as 80% of the appraised value of the property with as long as 20 years to repay.

For further information call at our Real Estate Loan Department

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
ONE MONTGOMERY STREET
Member Federal Deposit Insurance Corporation

TRADE notes

● GROUND was broken by General Electric on Jan. 1 for an additional factory at its 12-acre site at Anaheim, Calif. The plant will be used for manufacturing of Glyptal alkyd resins for paint base and will be operated as part of the G-E chemical department's resins and insulation materials division. Plans include a three-story process building and five one-story buildings, covering a total floor area of 35,000 sq. ft. Blaw-Knox Construction Co. of Pittsburgh is general contractor; Albert C. Mart, Los Angeles, is architect. General Electric's expansion plans at Anaheim also include a plastic division factory now being designed.

● REPRESENTATIVES of the Helwig Co., makers of carbon products, were in San Francisco recently for a three-day company conference. Westerners present included: J. R. Christensen, Salt Lake City; F. S. Fletcher, Los Angeles; M. G. Mueller, Denver; J. E. Richardson, Seattle; C. E. Riggs, Portland; J. T. Brown, San Francisco. Others came from Milwaukee headquarters, from Minneapolis, Omaha and Chicago.

● CHANGE of name of Warman Electric, Commercial Drive, Vancouver, B. C., was recently announced. J. Warman withdrew from active participation in this business some time ago, and the organization will consequently be known in future as Moore Sales Ltd. Harold Moore, who was associated with this electrical appliances, and furniture, radio and record sales business, is still on active service overseas.

● HARRY FERNIE, head of the firm of Fernie Bros., has now moved into his new store at 429 Victoria St., Kamloops, B. C. Fernie has been engaged in the electrical business for the past 25 years, and has operated an electrical contracting service and radio and appliance sales business at Kamloops for this period.

● ROMAINE MYERS, electrical consulting engineer, has moved to 1605 Tribune Tower, Oakland, from the Federal Bldg., where he had his office for many years.

● ALLEN-BRADLEY has appointed Campbell & George Co., 379 Brannan St., San Francisco, as its northern and central California representative. The Californa company will give complete sales engineering service to users of Allen-Bradley controls.

HELWIG SPEER
Carbon Products

BRUSH KITS OF ALL DESCRIPTIONS
CARBON BRUSHES OF ALL DESCRIPTIONS

HELWIG COMPANY
2544 N. 30TH ST. MILWAUKEE 10, WIS.

Pacific Coast Offices

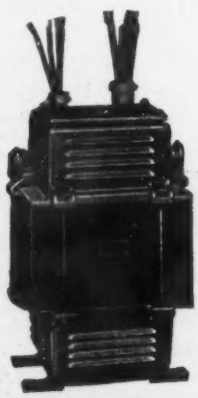
116 New Montgomery St.
San Francisco, Calif. Garfield 3274

166 Jackson Street
Seattle, Washington Elliott 7133

711 N. W. Everett St.
Portland, Oregon Beacon 3368

225 W. Pico Blvd.
Los Angeles, Calif. Prospect 2523

JEFFRIES



TRANSFORMERS

BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to exactly match your requirements—call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles, 11 Calif.

● GREAGLE LUMBER Co., owned by California Fruit Exchange, at Greagle, Calif., has installed a four-cylinder Busch-Sulzer diesel engine, direct connected to a G-E 125-kw., three-phase, 440-volt generator and a 125-kw. General Electric generator, direct connected to a high-speed steam engine, according to Frank Andrews, consulting engineer of Modesto.

● T. W. NOONAN has established the Columbia Radio & Electric at 4508 W. Tenth Ave., Vancouver, B. C. He will handle all types of radio and electrical appliances and will have a service department. During the war he saw service as flight lieutenant with the RCAF and for two years was chief radio-radar instructor for the West Coast.

● C. D. VAN HORN, former sales manager at Vancouver, B. C., for General Electric, has purchased the electrical firm of Cope & Son in that city, and was to take over its management at once. The business was established in 1899 as Cope & Frey and in 1906 was reorganized as Cope & Son. It is now located at 550 Cambie St.

● MILWAUKEE MACHINERY Co., Portland, has been appointed Northwest distributor for the complete line of Fairbanks-Morse turbine pumps. CASCADE MACHINERY Co., Seattle, will handle pumping equipment and the Fairbanks-Morse line of motors and electrical equipment.

● EDWARD J. DUGGAN Co., manufacturers' representatives at 988 Market St., San Francisco 2, handles among other lines PIB liquid insulator and Sol-Oil degreaser. Duggan was former manager of Westinghouse Electric Supply Co. branches at Salt Lake City and San Francisco.

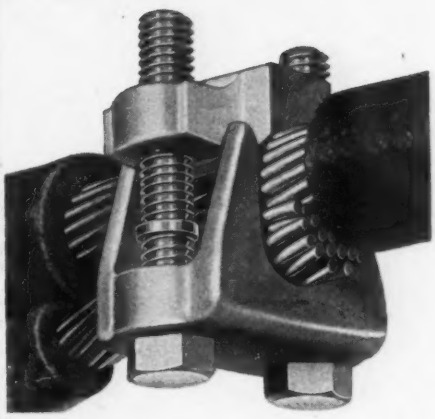
● TO ENGAGE in distribution of electrical appliances in southern California, the Oliver R. Jones Co. has opened offices at 2133 Temple St., Los Angeles 26. Capitalization is $50,000.

● JOHN ERICKSON has returned from war work and will now handle Curtis Lighting Co. equipment in northern California. His office is at 100 Herman St., San Francisco 2.

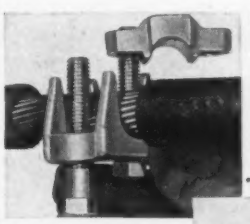
● CHARLES O. "Woody" WOODSWORTH, formerly manager of Denver's Stapleton Airport, is now affiliated as lighting engineer with the Schockett Electric Co. of Denver.

● EMERSON RADIO and Phonograph Corp. has appointed C. R. Bowers as field representative for the Rocky Mountain area.

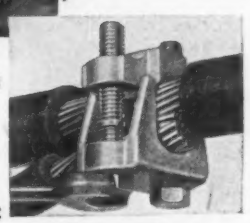
MATTHEWS UNICLAMP CONNECTORS



Made for use on copper or aluminum wires from 2/0 to 1000 MCM inclusive. They will connect two wires of their rated size or one wire of their rated size with one or more smaller tap-off wires down to No. 8 solid. They have many advantages over the larger sizes of connectors of the split bolt and other designs as they provide greater pressure between wires, hence greater holding power, are less costly, are easier to install and the assembled design is such that parts cannot become separated.



Fit on conductor as shown. Position top member and partially thread in free bolt.

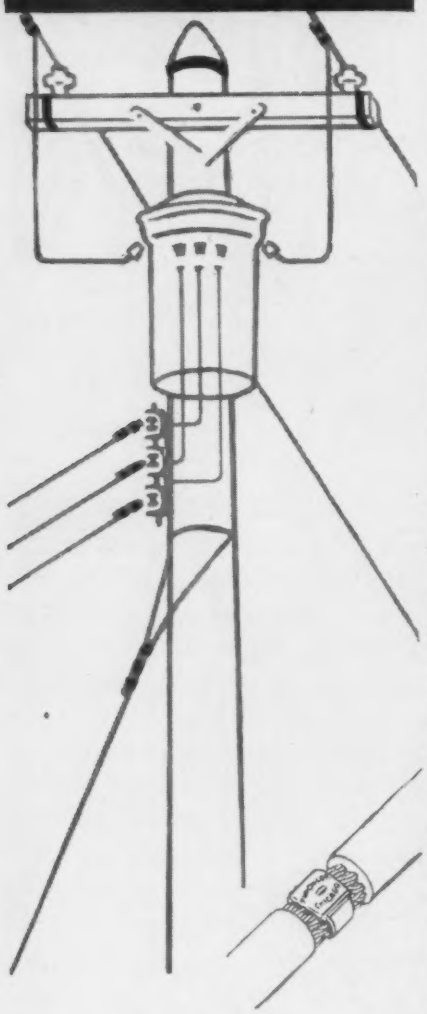


Insert tap wire and equally draw up both bolts.

Write for Bulletin 206

W. N. MATTHEWS CORP.
3722 FOREST PARK BLVD.
ST. LOUIS 8, MO.

PUNCH-LOK
Streamlined
Banding and Splicing Method



With Punch-Lok Clamps, applied with the Loking Tool, you can make connections easily, quickly, simply, safely . . . without taking down wires or installations. Will withstand any normal pull strain. Many other applications for repairing, banding, splicing, tying.

For descriptive catalog and name of nearest distributor, write Harry M. Thomas, Pacific Coast Representative, Dept. O, 1554 Oakland Avenue, Piedmont 11, California.

Keep Buying War Bonds

PUNCH-LOK COMPANY
321 N. Justine Street
Chicago 7, Illinois

● PLANS for a $75,000 warehouse and display room have been announced by the J. N. Ceazan Co., distributor for Crosley, Naxon, White Cross and other well-known appliances. The new structure, to be located in the 1900 block on Harbor Drive, will provide complete facilities for display, sales and offices for the organization. Cy Perkins will head the San Diego organization and will be assisted by appliance sales manager, Louis K. Markey, who pioneered Atwater Kent and Philco radios and General Electric appliance sales in San Diego in the early days of the industry. The Ceazan company will handle distribution for all of San Diego and Imperial counties and lower California.

● SUES-YOUNG Co., Los Angeles radio and appliance distributors, have appointed department managers as follows: Jack McLennan, Zenith radio division; Joseph Wogan, major appliance division, responsible for distribution of Speed Queen washers, Coolerator refrigerators and Thermador electric ranges; Marshall C. Wells, traffic appliance division, in charge of Regina Electrikbroom, Proctor appliances, Thermador heaters and others. McLennan has been in the radio business since 1925. Wogan was for many years with Easy Washing Machine Co. and more recently was factory representative for Speed Queen. Wells was formerly with Westinghouse.

● ONE HUNDRED 1946 Philco radios arrived in Spokane last month in the first transcontinental air cargo of merchandise to the Northwest. The shipment left Philadelphia on a Monday and arrived in Spokane 24 hours later after making two stops on the way. It was consigned to Tull & Gibbs, Philco distributors. The plane was met by Charles Hebberd, president of Tull & Gibbs and N. P. Rich, manager of the store's radio department.

● THE COLUMBIA Electric and Mfg. Co., Spokane, which during the war has been chiefly active in the manufacturing division, is re-entering the wholesaling of electric appliances and electronic and radio parts. Eric Johnston is president of the firm.

● T. R. ROUTH Co., handling metering and control equipment, has moved to 151 San Bruno Ave., San Francisco.

● THE ELECTRIC CORP. of San Francisco announced the return to its organization of Herman Ferschland.

● FRANK VIADA, Pleasanton, Calif., has been made an authorized dealer for Westinghouse home appliances.

PEOPLE
made this news

● A. S. GLASGOW, superintendent of electric transmission and distribution for San Diego Gas & Electric Co., retired Jan. 1, completing 44 years in the industry. After graduation from Pennsylvania State in 1901, he spent 15 years with G-E, then went with the San Diego company as its first district agent at Oceanside. He was transferred to San Diego in 1928.

● CLEM J. NEVITT succeeds Glasgow as electric transmission and distribution superintendent, San Diego Gas & Electric Co. He has been with the company since 1936; worked for San Joaquin Light & Power Co. before moving to San Diego, where his first job was with the city's water, utility evaluation and engineering departments.

● ROBERT P. MOSER has been named Northwest district advertising and sales promotion manager for G-E's apparatus department. He will be headquartered in Portland and his territory will include Oregon, Washington and northern Idaho. He was in Spokane with G-E before the war; during the war, served as a major in the Air Force.

● ARTHUR G. MAYER, former manager of the Washington Water Power Co. office at Coeur d'Alene, Idaho, has been appointed head of the utility's farm development department and will manage promotion of rural electrification and uses for electricity on farms.

● JOYCE L. MURPHY, Wolf Creek, Mont., was a national winner in the Westinghouse 4-H Club contest for better methods of doing work on the farm and in the home. THAIR CARVER, Ogden, Utah, was an alternate.

JOHN F. GOGINS, manager of the General Electric Co. in Spokane, has been elected to the executive committee of the Spokane Chamber of Commerce and automatically becomes a vice-president of the organization.

● LT. COL. J. E. UNDERHILL has taken over his duties as director of the industrial development department of B. C. Electric at Vancouver, succeeding H. N. Walters, now general sales manager.

● WILLIAM M. MOTT, head of Mott Electric, New Westminster, B. C., has been re-elected mayor of the city for another term.

The principal distinguishing feature of Type SM, S & C Fuses is the incorporation therein of a solid volatile arc-extinguishing material, instead of the familiar liquid, for assisting the current interrupting process. It is one of the means used in accomplishing the exceptionally high interrupting capacities as indicated in the accompanying table, and which are necessary in installations involving extra large concentrations of power.

Blown Fuses Refillable *Anywhere*

A second feature of Type SM Fuses is that when blown they may be restored at once for service by the simple replacement of the refill unit.

SHORT CIRCUIT INTERRUPTING RATINGS IN R.M.S. AMPERES

Fuse Volt. Rating	7,500	7,500	15,000	23,000	34,500
Circuit Volt.	2,300/4,000	6,600	13,200	22,000	33,000
*SMPC-4	17,500	15,000	12,500	10,000	7,500
SMP-4	27,500	25,000	20,000	15,000	10,000
*SMPC-5	30,000	25,000	20,000	17,500	15,000
SMP-5	40,000	35,000	30,000	25,000	20,000

*Equipped with condenser

New Bulletin Ready

New Bulletin 200E completely describing these extra high interrupting capacity, Type SM, Fuses . . . for applications up to 34.5 kv . . . is just off the press and ready for mailing. Bulletin 242 covering high voltage motor applications of Type SM Fuses is also available. You will profit by asking for these bulletins . . . now!

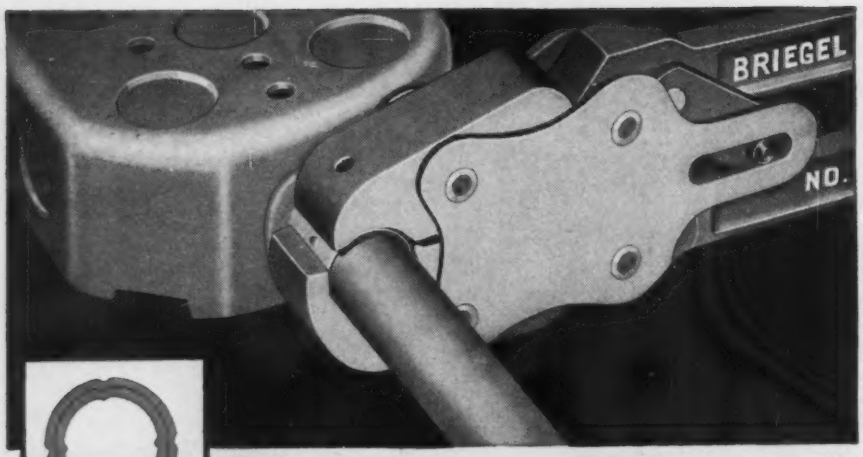
SCHWEITZER & CONRAD, INC.

For 35 years originators of High Voltage Protective and Switching Specialties of outstanding quality and performance

4425 Ravenswood Ave., Chicago 40, U. S. A.

Represented in Principal Cities (Consult Telephone Directory)
In Canada by Powerlite Devices, Ltd., Toronto, Ont.

Experience will choose an S & C Fuse



Cross section Showing Indentations.

E·M·T·UP THE QUICK WAY
Two Squeezes and it's Set

TWO QUICK SQUEEZES give you Finer, Faster Conduit Connections. B-M Fittings do away with the twisting, turning and tightening of nuts and save you valuable time and materials. Then too, they are stronger, neater and much easier to work with in tight places. Start using B-M Fittings today. Have more satisfied customers—more profits from each job!
(All B-M Fittings carry the Underwriters Seal of Approval)

DISTRIBUTED BY
The M. B. Austin Co., Chicago, Ill.
Clayton Mark & Co., Evanston, Ill.
Clifton Conduit Co., Jersey Cy., N. J.
Gen. Electric Co., Bridgeport, Conn.
The Steelduct Co., Youngstown, Ohio
Enameled Metals, Pittsburgh, Penn.
National Enameling & Mfg. Co., Pittsburgh, Pa.
Triangle Conduit & Cable Co., New Brunswick, N. J.

BM BRIEGEL METHOD TOOL CO. • Galva, Ill.

ILSCO
Electrical Connectors

No, we don't ship ILSCO CONNECTORS in fancy jewel cases. Nor do we make them from castings which are heavy, costly and of poor conductivity when compared to the pure 99.99% electrolytic copper of 100% conductivity used in all ILSCO CONNECTORS.
Remember—it isn't weight that counts . . . it's conductivity!
Write for 48-page illustrated catalog.
Western Distributors
ELECTRICAL SPECIALTY CO.
Seattle—San Francisco
STRIEBY & BARTON, LTD.
Los Angeles
ILSCO COPPER TUBE & PRODUCTS, Inc.
CINCINNATI, OHIO

H. H. Van Luven
307 East 3rd St. Los Angeles (13)
MUtual 5173
Manufacturers' Representative

CANNON ELECTRIC—DEVELOPMENT CO.
Hospital Signal Systems
Motor Plugs—Receptacles
Cable-Wire Terminals

LENZ ELECTRIC MFG. CO.
Lead—Braid Covered Cables and Wires
Tinsel and Copper Cordage
Special Cables

SIGNAL ENGINEERING & MFG. CO.
Relays—Bells—Horns—Code Call Systems
Fire Alarm Systems

HART MANUFACTURING COMPANY
Remote Control Equipment
Relays—Thermostats

STERLING SIREN CO.
Electric Sirens

OPERADIO MANUFACTURING CO.
Flexifone Intercommunication Equipment

TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

KNOX PORCELAIN CORP.
Electrical Porcelain

Williams

● ROY B. WILLIAMS, with the USBR for 33 years, has been transferred to Coulee Dam, as assistant supervising engineer for the Columbia Basin Project. For the past six years, he had been construction engineer for the Friant division of the Central Valley Project in California. He served on the Boulder development for several years, and has been connected with a number of irrigation projects in the west.

● HARRY W. BASHORE has retired as reclamation commissioner, following 39 years with the USBR, and has been succeeded by MICHAEL W. STRAUS, former assistant secretary of the interior. Bashore made engineering investigations preceding construction of the Grand Coulee and Central Valley developments and was connected with several irrigation projects in the West. He was made assistant reclamation commissioner in 1939 and commissioner in 1943.

● USBR has announced appointment of Philip P. Dickinson as assistant regional director and of Leland O. Graham as regional counsel for the Sacramento office, which is in charge of the Central Valley project. Dickinson was departmental representative and executive secretary of the advisory committee on policy for Central Valley and directed engineering and economic studies of the project.

● LEE C. PRICKETT, formerly in the War Department, Washington, D. C., has joined Bonneville as agricultural engineer in charge of the rural utilization program. He has served as assistant director of the national committee on the relation of electricity to agriculture, and with the TVA and the REA.

● R. J. NEWELL, Boise, is the new USBR regional director for the Pacific Northwest, succeeding Frank A. Banks, who asked to be relieved of the position to devote full time to the Columbia Basin project, of which he is supervising engineer. Newell has been associate regional director since the fall of 1943, when the regional offices were established.

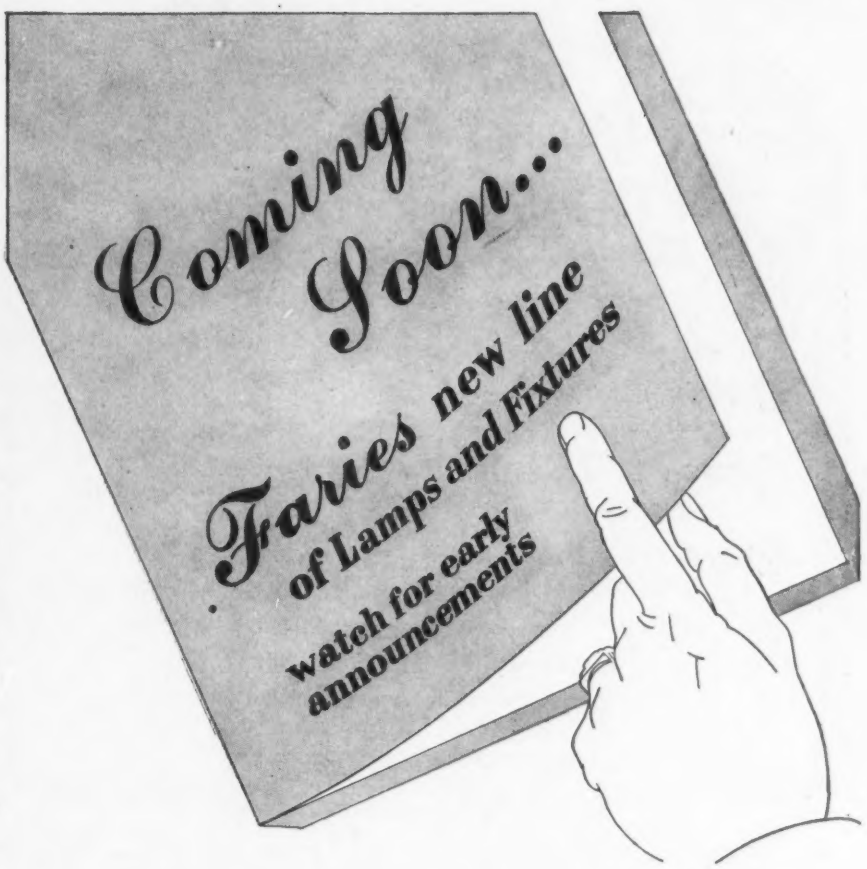
● BEN W. CREIM has recently been made regional power manager for USBR's Region II, with headquarters at Sacramento. He has worked with irrigation districts and municipalities in California, for the Los Angeles Bureau of Power & Light, and for the past 3½ years has been in the Navy. He was discharged with the rank of commander.

● W. J. LIND recently was made manager of the lamp and lighting division of the Canadian General Electric Co., Vancouver. He had been lighting service engineer.

● R. E. BROWN is now Pacific Coast supervisor of domestic refrigerators and home freezers for the Westinghouse appliance division. He has been with Frigidaire and with G-E on the West Coast and for the past three years has been with Moore Dry Dock Co. in Oakland, Calif.

● H. NORMAN MILLER has succeeded L. G. FEAR as Westinghouse manager at Portland. Fear is acting as the company's special representative in both the Seattle and Portland areas. Miller has been a member of the company's industrial sales staff at Portland for 19 years.

Miller



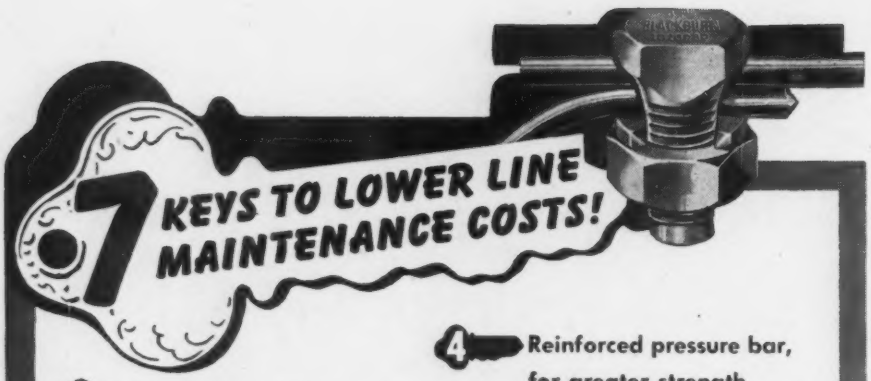
We're just about ready with the most attractive and modern line of Lamps and Fixtures you've ever seen.

New designs have been flowing off the drafting boards . . . tools and dies are being rushed to the production lines . . . and soon, very soon, we'll be ready with new model desk lamps, floor lamps and clamp-on lamps in both incandescent and fluorescent . . . including special designs for the "Circline" and "Slimline" fluorescents.

Meanwhile, partial shipments are being made of items described in our No. 47 catalog. As production increases from week to week, shipments will go forward more promptly and in greater volume. So, take care of your customers' immediate demand from our No. 47 Flyer Catalog. If you don't have your copy, *write for it today.*

Faries Mfg. Co., Decatur, Ill.

PIONEERS IN LIGHTING EQUIPMENT SINCE 1880



7 KEYS TO LOWER LINE MAINTENANCE COSTS!

1 Strongest connector made.

2 Can be used over and over again.

3 Conductivity of joint better than solid wire itself.

4 Reinforced pressure bar, for greater strength.

5 All corners rounded.

6 Machined to close tolerances.

7 Full threads on screw for maximum strength.

Over 100 Conveniently-Located Jobbers' Stocks

BLACKBURN *Hi-Strength* CONNECTORS

JASPER BLACKBURN PRODUCTS CORP., Main, Clinton and Madison Sts., St. Louis 6, Mo.

GEO. E. HONN CO.

420 Market St. San Francisco, Calif.

SUtter 7565

Manufacturers' Representative for:

American Cross-Arm, Inc.
Cross-Arms, Hardwood Pins and Moulding

Bartlett Mfg. Co.
Tree Trimming Equipment

Burndy Engineering Co.
Connectors and Lugs—All Types

Columbia Electric Mfg. Co.
Crompton Tong Test Ammeters

Cornell-Dubilier Electric Corp.
Capacitors for Power Factor Correction

T. J. Cope, Inc.
Underground Tools & Equipment

Herman D. Steel
Meter Jewels

Kellems Co.
Cable Grips for Pulling and Permanent Support

Mineralac Electric Co.
Insulating Compound, Clips, Hangers, and Statiscopes

Schweitzer & Conrad
Fuses and Protective Devices

Specialty Device
Cone Anchors, Guy Guards and Earth Augers

The States Company
Test Blocks and Meter Testing Equipment

R. Thomas & Sons Co.
Pin-type and Suspension Insulators

Electroline
Wire Rope Fittings

"WHAT CAN IT DO FOR ME?"

Advertising that is read with this thought in mind may provide the solution to a problem that has kept you awake nights.

We all know "It Pays To Advertise." It pays just as big to investigate WHAT IS ADVERTISED—every month in

ELECTRICAL WEST

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

There is a Tork Clock for every regular switching job: 60 minute, 4 hour or daily cycles.

Bulletins on request

THE TORK CLOCK CO., Inc.

MOUNT VERNON, N. Y.

Western Representatives

A. R. Slimmon, 445 E. 3rd St....Los Angeles
Geo. H. Curtiss, 540 McAllister St....S. F.
H. M. Sayers, 1101 Eastlake Ave.....Seattle
Stevens Sales Co., 41 P.O. Place, Salt Lake
Felix Simon, P.O. Box 614.....Denver
H. Geo. Shefler, P.O. Box 1587.....Phoenix

● MAJOR WAYNE H. SNOWDEN has returned to ELECTRICAL WEST as engineering editor after almost five years of military service, two years of which were spent overseas. He was ordnance executive officer of the Third Infantry Division and saw action in Africa, Sicily, Italy and France. He was awarded the Legion of Merit for activity in connection with the Sicilian and Italian campaigns and later received an oak leaf cluster to the Legion of Merit for outstanding work on the War Department general staff, to which he was attached in Washington from August 1944 to October 1945.

● WALTER C. HESTON, who has been functioning as engineering editor of ELECTRICAL WEST, will now devote his full time to *Electrical World* as Pacific Coast editor.

● C. E. KIRKPATRICK, native Californian and formerly with Graybar at San Francisco and at Salt Lake City, has been appointed Albany, N. Y., manager for that company. A graduate of the U. S. Naval Academy, he was recalled to active duty early in 1942; was recently returned to the retired list as a lieutenant commander.

● L. V. SCHRODER has been made Graybar merchandising manager at Seattle. He was former educational supervisor for the Frigidaire Sales Corp. in Portland and, since joining Graybar, has been in Spokane, first as salesman, then appliance sales manager and finally merchandising manager.

● H. C. KORTHALS will replace Schroder as Graybar merchandising manager at Spokane. Before the war he was territory manager and special representative for Hotpoint in Spokane and Seattle, and during the war he served on the War Finance Committee of the U. S. Treasury.

● J. H. COX has been appointed engineering manager for the Westinghouse Pacific Coast manufacturing and repair division headquarters at Emeryville, Calif. He formerly was manager of the mercury arc rectifier engineering section in the transportation and generator division at East Pittsburgh.

● RUSSELL G. FRYBURG is now Pacific Northwest manager for the radio division of Bendix Aviation Corp. From headquarters in Portland, he will cover Washington, Oregon and Salt Lake City.

● NORMAN GARDNER, district merchandising manager, Canadian Westinghouse Ltd., has been elected chairman of the sales executive group of the Vancouver B. C. Board of Trade.

● HOLLIS H. ARNOLD, whose legal residence is San Francisco but who has spent a great many years in the Orient prior to 1937 as consulting engineer affiliated with the J. G. White Engineering Co., was in San Francisco again recently on his way back to the Orient. During the past few war years he has served with the War Production Board in Washington, D. C. A member of IES, he has also represented the lamp companies from China to Capetown in the Far East.

● PROF. HOMER J. DANA has returned to his post as assistant director in charge of the Washington State College engineering experiment station. During his wartime leave, he invented a device for reducing static on aircraft, now being patented for the college. This development has been done largely with General Electric Co. Stuart Dunham, G-E research engineer from Schenectady, has been with Dana at Pullman since his return.

● W. M. FROISLAND, Fairbanks Morse, has been made San Francisco manager of the company's electric department, in charge of sales in northern California, Utah, parts of Idaho and the Hawaiian Islands. He replaces H. G. Nagel, who is now manager of the diesel department. Froisland has been representing the company in the East Bay for ten years; before that was in the Idaho territory.

● FILMORE C. DOYLE has been named Los Angeles manager by Bendix Home Appliance Inc. He joined Bendix after five years in the sales department of the Los Angeles branch of Leo J. Meyberg Co.

● RAY W. TURNBULL, president, Edison General Electric Appliance Co., and former Westerner, was elected vice-president of the National Electrical Manufacturers Assn.

● GEORGE I. DRENNAN, Pacific Power & Light field superintendent, recently celebrated his fortieth anniversary with the company and its predecessors.

● AS WESTERN manager for Sylvania equipment tube sales, L. A. WHEELOCK will have under his supervision all territory west of Chicago.

● FRED A. FOWLER has returned to Portland after 27 months with the Sea-Bees and has rejoined the Fowler Mfg. Co. as sales manager.

● H. E. FARRIS, former new business manager for Mountain States Power Co., Albany, is now with Stubbs Electric in Portland.

Deaths

● DR. ROBERT C. STINCHFIELD, who retired from the Southern California Edison Co. in 1934 after serving as chief surgeon of the company for 25 years, died Nov. 24 in Los Angeles. Dr. Stinchfield was chief surgeon at the Fortuna mine in Arizona before joining the Edison company in 1902. He went immediately to Kern River to be in charge of medical care of those associated with the building of the company's Kern River No. 1 hydro plant. When the company's medical department was established in 1909, Dr. Stinchfield was placed in charge as chief surgeon and continued in that position until he retired Jan. 1, 1934.

● JACK MOTT, Mott Electric, Vancouver, B. C., was killed in a hunting accident. Mr. Mott, who is the son of William M. Mott, head of the firm, had recently received his discharge from the RCAF, following four years of service, three of them overseas.

● WILLIAM PRICE MACDONALD, 53, manager at Nanaimo, B. C. of the Nanaimo-Duncan Utilities from 1931 until it was taken over by the government, died Nov. 30. Mr. Macdonald continued as manager for the B. C. Power Commission after the take-over.

GUESSING CAN BE EXPENSIVE

Cut production costs. . . . take the guess work out of electrical assembly or maintenance jobs.

Custom-built mica parts are now available. Carefully built to your exact specifications, these parts are punched from the finest grade raw mica and then built up with shellac as a binder. It becomes a simple and QUICK operation to pick up one of these parts and drop it into place . . . without the costly production delay of trial and error assembly when you use random sizes.

Custom-built mica parts are priced by the thousand, instead of by the pound—giving you an accurate price per appliance.

For prices, samples and complete data, send your specifications. For uniformly high quality mica products, always call:

MARWOOD LIMITED

Seattle ELliott 4747 | Portland BEacon 5123 | San Francisco HEmlock 7893 | Los Angeles MUtual 3241

INDEX TO ADVERTISERS

January, 1946

Allis-Chalmers Mfg. Co. 13
Aluminum Co. of America 15
Anaconda Wire & Cable Co. 89

Benjamin Electric Mfg. Co. 93
Bethlehem Steel Co. 37
Blackburn Corp., Jasper 118
Briegel Method Tool Company 116
BullDog Electric Prod. Co. 12
Burndy Engineering Co., Inc. 107

Certified Ballasts Mfgrs. 10
Chance Company, A. B. 39
Cole Electric Co. 38
Crescent Ins. Wire & Cable Co. 18
Crocker 1st Nat'l Bank 112
Crouse-Hinds Company 111
Curtis Lighting, Inc. 29

Driver-Harris Co. 108

Electromode Corp. 44

Faries Mfg. Co. 117
Federal Electric Products Co. 14
Four Wheel Drive Auto Co. 7

General Cable Corp. 42, 43
General Electric Co.:
Bridgeport 21, 27, 31, 98
Cleveland 9
Schenectady 1, 41, 51
General Luminescent Corp. 106
General Mills, Inc. 3

Helwig Company 113
Honn Co., George E. 118
Holophane Company, Inc. 36
Hubbard & Company 45

Ideal Commutator Dresser Co. 112
Ilsco Copper Tube & Prod. Inc. 116
Indiana Steel & Wire Co. 112
Insulation & Wires, Inc. 108

Jeffries Transformer Company 113
Johns-Manville Corp. 109

Kearney Corp., James R. 97
Klein & Sons, Mathias 8
Kyle Corp. 19

Leader Electric Mfg. Co. 4
Lloyd Products 16

Marwood, Limited 119
Matthews Corp., W. N. 113
Miller Co., The 91
Mitchell Mfg. Co. 47

National Elec. Prod. Corp. 95
Noblitt-Sparks Industries, Inc. 22

Okonite Company 11
O. Z. Electrical Mfg. Co. 49

Pacific Coast Electrical Assn. ..... 4th Cover
Pacific Gas and Electric Co. ..... 3rd Cover
Paragon Electric Company 46
Penn Union Electric Corp. 26
Punch-Lok Company 114

Railley Corp., The 40
Reliable Electric Company 101
Rittenhouse Co., Inc., The A. E. 30
Rome Cable Company 48

Samson United Corp. 25
Schweitzer & Conrad, Inc. 115
Science Illustrated 33, 34
Simplex Wire & Cable Co. 5
Smoot-Holman Company 102
Southern California Edison Co. Ltd. ..... 2nd Cover
Spang-Chalfant Div., Nat'l Supply Co. 6
Square D Company 17
Standard Oil Company 20

Thomas & Betts Co., Inc. 100
Tork Clock Co., Inc. 118
Treasury Dept. 105
Trico Fuse Mfg. Co. 106
Tuttle & Kift, Inc. 32

Union Pacific Railroad Co. 99
U. S. Rubber Company 52

Van Luven Co., H. H. 116

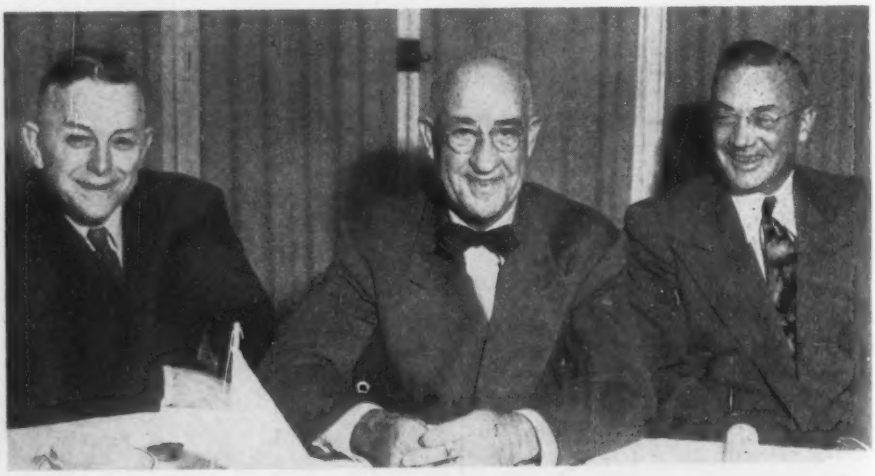
Wiegand Co., Edwin L. 28

Youngstown Sheet & Tube Co. 35

PROFILES *of the month*

Lieutenant Colonel Joseph H. Pengilly (right), executive vice-president Square D Co., Los Angeles, with Major General Homer M. Groninger, commanding general, San Francisco Port of Embarkation, at time Pengilly received the Medal of the Legion of Merit. Pengilly served under General Groninger at the New York Port of Embarkation from August 1942 to June 1945 and at the San Francisco Port of Embarkation from June 1945 until his discharge from military service last October 15

Members of the Earl S. Condon Co., Los Angeles, pictured at a recent meeting: from left (front row): Ruth Hansen, Mrs. Mabelle Crowley, Carroll McLellan, (back) Warner E. Marsden, Earl S. Condon, Ashton Davis Jr., Charles Morris



Jack Frost (center), retiring agricultural sales manager, Pacific Gas and Electric Co., with Thor Christensen (left), farm division, and Jack McElroy, Fresno division sales manager, at the recent Fresno luncheon honoring Frost. A feature of the luncheon was the presentation to Frost of a "boat stretching" certificate signed by his many friends in the PG and E agricultural power dept. Toy given him with certificate will be exchanged for real boat when manufacture is resumed

"Poor Henry was caught in the act of snatching the one reading-size lamp bulb to fill an empty socket in his favorite lamp.

He didn't know the family had been down town stocking up on fresh new lamp bulbs.

He did not know that bulb-snatching days were over and there is a plentiful supply of lamp bulbs available."

—An excerpt from a P. G. and E. newspaper advertisement

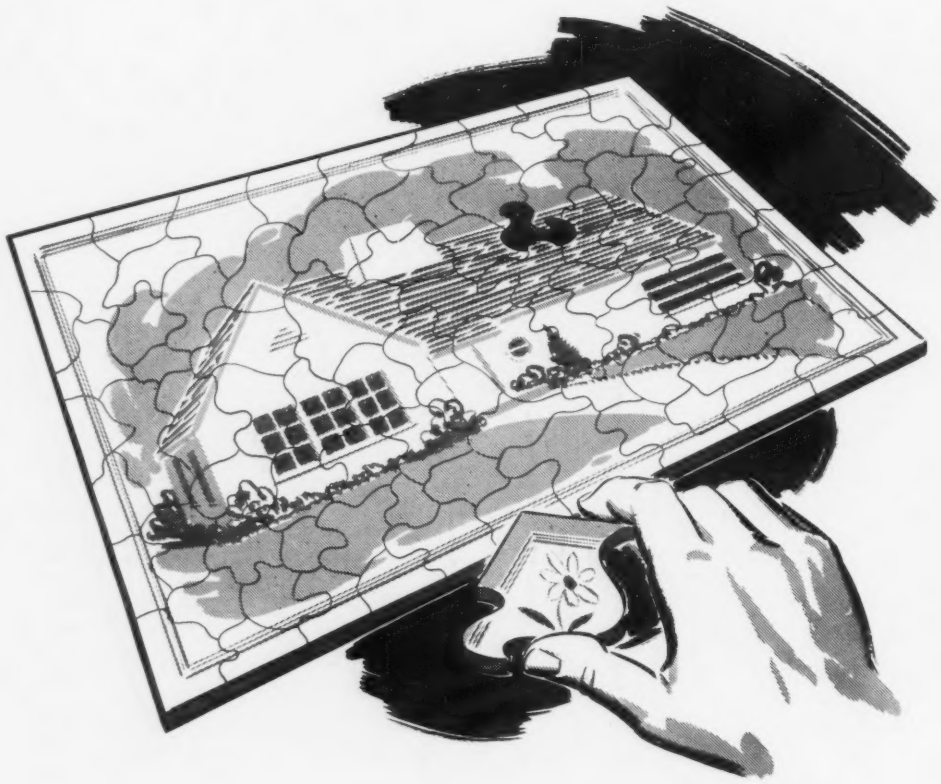
FILL THE EMPTY SOCKETS

While this message orginally was directed to our householder customers, its lesson might well be applied by every other user of electric light — store keepers, office managers, plant superintendents. More light for more comfort, more health, more business, more production!

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

EW—101-146



Electric Wiring can be Misfit, too!

More than 50,000 war-built homes on the Pacific Coast have "misfit" wiring . . . wiring suited to homes of twenty-five years ago but out-of-date according to modern standards. Such wiring does not permit full use of today's electrical services. Over-loaded, "misfit" wiring must be replaced before new appliances can be used satisfactorily. *The first step to successful postwar appliance selling is the installation of adequate wiring.* This is a challenge to the whole electrical industry! Now is the time for planning to help home-owners re-wire properly. If you do not already know the facts about modern wiring, why not get them? Then think, talk and *sell* adequate wiring!

PACIFIC COAST ELECTRICAL ASSOCIATION

601 W. FIFTH ST., LOS ANGELES 13, CALIFORNIA • 447 SUTTER ST., SAN FRANCISCO 8, CALIFORNIA